



BRIGHAM YOUNG UNIVERSITY | 2015-2016

# GRADUATE C A L O G

*“I will impart unto you of my Spirit, which shall enlighten your mind,  
which shall fill your soul with joy”  
D&C 11:13*



# GRADUATE CATALOG

2015–2016

BRIGHAM YOUNG UNIVERSITY

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## THE UNIVERSITY

**B**RIGHAM Young University offers an exceptional educational opportunity for the well-prepared graduate student who is seeking an environment where learning experiences with dedicated scholars characterize graduate study. Established and sponsored by The Church of Jesus Christ of Latter-day Saints, BYU is the largest privately owned university in the United States. The university president, Kevin J. Worthen, is directly responsible to the board of trustees, led by the president of The Church of Jesus Christ of Latter-day Saints and composed of Church authorities. In a time of constantly changing human values and increased challenges for higher education, BYU holds steadfastly to a singular vision that combines reasoned and revealed learning. Along with extensive undergraduate programs, BYU offers master's and doctoral degrees in a variety of disciplines through approximately fifty graduate departments.

Founded in 1875 as Brigham Young Academy, the campus has grown from one building to 500 buildings on more than 600 acres. Its first class of twenty-nine students was taught by the academy's founding scholar, Karl G. Maeser. Now more than 1,500 full-time faculty instruct 33,000 students. From its modest beginnings Brigham Young University has grown to become a distinguished institution of private higher education. At BYU teaching and scholarly research are valued as essential complements of one another. Faculty and students work side by side in collegial scholarship enhanced by mutual commitment to the highest ideals of professional ethics and spiritual values.

Situated at the foot of the beautifully rugged Wasatch Range of the Rocky Mountains and bounded on the west by twenty-three-mile-long Utah Lake, the campus is the focal point of a city of 118,000 and a valley of 540,000. Beyond it to the south and east are spectacular areas of vast sandstone canyons and monoliths, several of which are national parks. Forty-five miles north is Salt Lake City.

The faculty at BYU have been schooled at some of the leading universities of the nation as well as of other countries, and many of them have achieved national and international prominence as teachers and scholars.

## MISSION OF BRIGHAM YOUNG UNIVERSITY

**T**HE mission of Brigham Young University—founded, supported, and guided by The Church of Jesus Christ of Latter-day Saints—is to assist individuals in their quest for perfection and eternal life. That assistance should provide a period of intensive learning in a stimulating setting where a commitment to excellence is expected and the full realization of human potential is pursued.

All instruction, programs, and services at BYU, including a wide variety of extracurricular experiences, should make their own contribution toward the balanced development of the total person. Such a broadly prepared individual will not only be capable of meeting personal challenge and change but will also bring strength to others in the tasks of home and family life, social relationships, civic duty, and service to mankind.

To succeed in this mission the university must provide an environment enlightened by living prophets and sustained by those moral virtues which characterize the life and teachings of the Son of God. In that environment these four major educational goals should prevail:

- All students at BYU should be taught the truths of the gospel of Jesus Christ. Any education is inadequate which does not emphasize that His is the only name given under heaven whereby mankind can be saved. Certainly all relationships within the BYU community should reflect devout love of God and a loving, genuine concern for the welfare of our neighbor.
- Because the gospel encourages the pursuit of all truth, students at BYU should receive a broad university education. The arts, letters, and sciences provide the core of such an education, which will help students think clearly, communicate effectively, understand important ideas in their own cultural tradition as well as that of others, and establish clear standards of intellectual integrity.
- In addition to a strong general education, students should also receive instruction in the special fields of their choice. The university cannot provide programs in all possible areas of professional or vocational work, but in those it does provide the preparation must be excellent. Students who graduate from BYU should be capable of competing with the best in their fields.
- Scholarly research and creative endeavor among both faculty and students, including those in selected graduate programs of real consequence, are essential and will be encouraged.

In meeting these objectives BYU's faculty, staff, students, and administrators should also be anxious to make their service and scholarship available to The Church of Jesus Christ of Latter-day Saints in furthering its work worldwide. In an era of limited enrollments, BYU can continue to expand its influence both by encouraging programs that are central to the Church's purposes and by making its resources available to the Church when called upon to do so.

We believe the earnest pursuit of this institutional mission can have a strong effect on the course of higher education and will greatly enlarge Brigham Young University's influence in a world we wish to improve.

## AIMS OF A BYU EDUCATION

*Education is the power to think clearly,  
the power to act well in the world's work, and the power to appreciate life.*  
--Brigham Young 1

The mission of Brigham Young University is “to assist individuals in their quest for perfection and eternal life” (hereafter Mission Statement). To this end, BYU seeks to develop students of faith, intellect, and character who have the skills and the desire to continue learning and to serve others throughout their lives. These are the common aims of all education at BYU. Both those who teach in the classroom and those who direct activities outside the classroom are responsible for contributing to this complete educational vision.

The statement that follows reaffirms and expands on the earlier and more general Mission Statement adopted in 1981. As the quotations under each heading suggest, this document also draws on the religious and educational teachings of the university’s founding prophet, Brigham Young. Quotations within the text come from the scriptures and from the counsel of modern prophets, whose teachings about BYU lay the foundation of the university’s mission.

The following four sections discuss the expected outcomes of the BYU experience. A BYU education should be (1) spiritually strengthening, (2) intellectually enlarging, and (3) character building, leading to (4) lifelong learning and service. Because BYU is a large university with a complex curriculum, the intellectual aims are presented here in somewhat greater detail than the other aims. Yet they are deliberately placed within a larger context. The sequence flows from a conscious intent to envelop BYU’s intellectual aims within a more complete, even eternal, perspective that begins with spiritual knowledge and ends with knowledge applied to the practical tasks of living and serving.

### Spiritually Strengthening

*Brother Maeser, I want you to  
remember that you ought not to teach even  
the alphabet or the multiplication tables  
without the Spirit of God.*  
--Brigham Young<sup>2</sup>

The founding charge of BYU is to teach every subject with the Spirit. It is not intended “that all of the faculty should be categorically teaching religion constantly in their classes, but . . . that every... teacher in this institution would keep his subject matter bathed in the light and color of the restored gospel.”<sup>3</sup>

This ideal arises from the common purpose of all education at BYU--to build testimonies of the restored gospel of Jesus Christ. A shared desire to “seek learning, even by study and also by faith” (D&C 88:118) knits BYU into a unique educational community. The students, faculty, and staff in this community possess a remarkable diversity of gifts, but they all think of themselves as brothers and sisters seeking together to master the academic disciplines while remaining mastered by the higher claims of discipleship to the Savior.

A spiritually strengthening education warms and enlightens students by the bright fire of their teachers’ faith while enlarging their minds with knowledge. It also makes students responsible for developing their own testimonies by strenuous effort. Joseph Smith’s words apply equally to faculty and students at BYU: “Thy mind, O man! if thou wilt lead a soul unto salvation, must stretch as high as the utmost heavens, and search into and contemplate the darkest abyss, and the broad expanse of eternity--thou must commune with God.”<sup>4</sup> Students need not ignore difficult and important questions. Rather, they should frame their questions in prayerful, faithful ways, leading them to answers that equip them to give “a reason of the hope that is in” them (1 Peter 3:15) and to articulate honestly and thoughtfully their commitments to Christ and to his Church.

## Intellectually Enlarging

*Every accomplishment, every polished grace, every useful attainment  
in mathematics, music, and in all science and art belong to the Saints,  
and they should avail themselves as expeditiously as possible of the wealth of knowledge the sciences offer to  
every diligent and persevering scholar.*  
--Brigham Young<sup>5</sup>

The intellectual range of a BYU education is the result of an ambitious commitment to pursue truth. Members of the BYU community rigorously study academic subjects in the light of divine truth. An eternal perspective shapes not only how students are taught but what they are taught. In preparing for the bachelor's degree, students should enlarge their intellects by developing skills, breadth, and depth: (1) skills in the basic tools of learning, (2) an understanding of the broad areas of human knowledge, and (3) real competence in at least one area of concentration. Further graduate studies build on this foundation.

### Undergraduate

**1. Skills.** BYU undergraduates should acquire the basic tools needed to learn. The essential academic learning skills are the abilities to think soundly, to communicate effectively, and to reason proficiently in quantitative terms. To these ends, a BYU bachelor's degree should lead to:

- Sound thinking--reasoning abilities that prepare students to understand and solve a wide variety of problems, both theoretical and practical. Such skills include the ability to keep a proper perspective when comparing the things that matter most with things of lesser import. They also include the ability to engage successfully in logical reasoning, critical analysis, moral discrimination, creative imagination, and independent thought.
- Effective communication--language abilities that enable students to listen, speak, read, and write well; to communicate effectively with a wide range of audiences in one's area of expertise as well as on general subjects. For many students this includes communicating in a second language.
- Quantitative reasoning--numerical abilities that equip students with the capacity to understand and explain the world in quantitative terms; to interpret numerical data; and to evaluate arguments that rely on quantitative information and approaches.

**2. Breadth.** BYU undergraduates should also understand the most important developments in human thought as represented by the broad domains of knowledge. The gospel provides the chief source of such breadth because it encompasses the most comprehensive explanation of life and the cosmos, supplying the perspective from which all other knowledge is best understood and measured. The Lord has asked his children to "become acquainted with all good books, and with languages, tongues, and people" (D&C 90:15); to understand "things both in heaven and in the earth, and under the earth; things which have been, things which are, things which must shortly come to pass; things which are at home, things which are abroad; the wars and the perplexities of the nations . . . ; and a knowledge also of countries and of kingdoms" (D&C 88:79). "Because the gospel encourages the pursuit of all truth, students at BYU should receive a broad university education [that will help them] understand important ideas in their own cultural tradition as well as that of others" (Mission Statement). Specifically, BYU undergraduate students should be educated in the following broad areas of human knowledge:

- Religion--the doctrines, the covenants, the ordinances, the standard works, and the history of the restored gospel, as well as an awareness of other religious traditions.
- Historical perspective --the development of human civilization, appreciation for the unique contributions of America to modern civilization, and a general historical perspective, including perspective on one's own discipline.
- Science--the basic concepts of the physical, biological, and social sciences, and a recognition of the power and limitations of the scientific method- preferably through laboratory or field experience.



- Arts and Letters --lively appreciation of the artistic, literary, and intellectual achievements of human cultures--including Western culture and, ideally, non-Western as well.
- Global awareness --informed awareness of the peoples, cultures, languages, and nations of the world.

**3. Depth.** BYU undergraduates should develop competence in at least one area of concentration. Competence generally demands study in depth. Such in-depth study helps prepare students for their life's work; it also teaches them that genuine understanding of any subject requires exploring it fully. Students normally acquire such depth from their major and minor fields. BYU's religion requirement also asks all students to develop depth in scriptural studies and religion.

Depth does not result merely from taking many courses in a field. Indeed, excessive course coverage requirements may discourage rather than enhance depth. Depth comes when students realize "the effect of rigorous, coherent, and progressively more sophisticated study." Depth helps students distinguish between what is fundamental and what is only peripheral; it requires focus, provides intense concentration, and encourages a "lean and taut" degree that has a "meaningful core" and a purposefully designed structure (Memorandum to the Faculty No. 13). In addition to describing carefully structured academic majors, this description applies to well-designed BYU courses of all kinds.

The chief result of depth is competence. BYU's students should be "capable of competing with the best students in their field" (Mission Statement). Even so, undergraduate study should be targeted at entrance-level, not expert-level, abilities. The desire for depth should not lead to bachelor's degrees that try to teach students everything they will need to know after graduation. Students should be able to complete their degrees within about four years.

Undergraduate programs should prepare students to enter the world of work or to pursue further study. Often this requires educational activities that help upperclassmen culminate their studies by integrating them in a capstone project, honors thesis, senior seminar, or internship. By the time they graduate, students should grasp their discipline's essential knowledge and skills (such as mathematical reasoning, statistical analysis, computer literacy, foreign language fluency, laboratory techniques, library research, and teaching methods), and many should have participated in scholarly or creative activities that let them demonstrate their mastery.

## Graduate

Building on the foundation of a strong bachelor's degree, graduate education at BYU asks for even greater competency. Graduate studies may be either academic or professional and at either the master's or doctoral level. In all cases, BYU graduate programs, like undergraduate programs, should be spiritually strengthening as well as intellectually enlarging.

Graduate programs should help students achieve excellence in the discipline by engaging its primary sources; mastering its literature, techniques, and methodologies; and undertaking advanced systematic study - all at a depth that clearly exceeds the undergraduate level. In addition, graduate programs should prepare students to contribute to their disciplines through their own original insights, designs, applications, expressions, and discoveries. Graduate study should thereby enable a variety of contributions - such as teaching complex knowledge and skills, conducting original research, producing creative work that applies advanced learning in the everyday world, and extending professional service to the discipline and to society.

\* \* \*

These intellectual aims of a BYU education are intended to give students understanding, perspective, motivation, and interpersonal abilities--not just information and academic skills. BYU should furnish students with the practical advantage of an education that integrates academic skills with abstract theories, real-world applications, and gospel perspectives. Such an education prepares students who can make a difference in the world, who can draw on their academic preparation to participate more effectively in the arenas of daily life. They are parents, Church leaders, citizens, and compassionate human beings who are able to improve the moral, social, and ecological environment in which they and their families live. They are scientists and engineers who can work

effectively in teams and whose work reflects intellectual and moral integrity; historians who write well and whose profound understanding of human nature and of divine influences informs their interpretation of human events; teachers whose love for their students as children of God is enriched by global awareness and foreign language skill; artists whose performances seek to be flawless in both technique and inspiration; business leaders whose economic judgments and management styles see financial reward not as an end but as a means to higher ends. BYU graduates thus draw on an educated intellect to enhance not only what they know but also what they do and, ultimately, what they are.

## Character Building

*A firm, unchangeable course of righteousness  
through life is what secures to a person true intelligence.*  
--Brigham Young<sup>6</sup>

Because it seeks to educate students who are renowned for what they are as well as for what they know, Brigham Young University has always cared as much about strong moral character as about great mental capability. Consequently, a BYU education should reinforce such moral virtues as integrity, reverence, modesty, self-control, courage, compassion, and industry. Beyond this, BYU aims not merely to teach students a code of ethics but to help them become partakers of the divine nature. It aspires to develop in its students character traits that flow from the long-term application of gospel teachings to their lives. This process begins with understanding humankind's eternal nature and ends with the blessing of eternal life, when human character reflects in fully flowered form the attributes of godliness. Along the way, the fruits of a well-disciplined life are augmented and fulfilled by the fruits of the spirit of Jesus Christ--such as charity, a Christlike love for others, which God "hath bestowed upon all who are true followers of his Son, Jesus Christ" (Moroni 7:48). Students thus perfect their quest for character development by coming unto Christ through faith, repentance, and righteous living. Then their character begins to resemble his, not just because they think it should but because that is the way they are.

President David O. McKay taught that character is the highest aim of education: above knowledge is wisdom, and above wisdom is character. "True education," he explained, "seeks to make men and women not only good mathematicians, proficient linguists, profound scientists, or brilliant literary lights, but also honest men with virtue, temperance, and brotherly love."<sup>7</sup> Consequently, a BYU education should bring together the intellectual integrity of fine academic discipline with the spiritual integrity of personal righteousness. The result is competence that reflects the highest professional and academic standards--strengthened and ennobled by Christlike attributes.

Thus understood, the development of character is so important that BYU "has no justification for its existence unless it builds character, creates and develops faith, and makes men and women of strength and courage, fortitude, and service--men and women who will become stalwarts in the Kingdom and bear witness of the . . . divinity of the gospel of Jesus Christ. It is not justified on an academic basis only."<sup>8</sup> Rather, it fulfills its promise when "the morality of the graduates of this University provide[s] the music of hope for the inhabitants of this planet."<sup>9</sup>

Every part of the BYU experience should therefore strengthen character--academic integrity in taking a test or writing a research paper; sportsmanship on the playing field; the honest reporting of research findings in a laboratory; careful use of university funds derived from the tithes of Church members; treating all other people with dignity and fairness; and wholehearted acceptance of commitments made to bishops and parents. Character is constructed by small decisions. At this personal level of detail, BYU will realize its hope of teaching "those moral virtues which characterize the life and teachings of the Son of God" (Mission Statement).

## Lifelong Learning and Service

*We might ask, when shall we cease to learn?  
I will give you my opinion about it;  
never, never. . . . We shall never cease to learn, unless  
we apostatize from the religion of Jesus Christ.  
--Brigham Young <sup>10</sup>*

*Our education should be such as to  
improve our minds and fit us for increased usefulness;  
to make us of greater service to the human family.  
--Brigham Young <sup>11</sup>*

Well-developed faith, intellect, and character prepare students for a lifetime of learning and service. By “entering to learn” and continuing to learn as they “go forth to serve,” BYU students strengthen not only themselves - they “also bring strength to others in the tasks of home and family life, social relationships, civic duty, and service to mankind” (Mission Statement).

**1. Continual Learning.** BYU should inspire students to keep alive their curiosity and prepare them to continue learning throughout their lives. BYU should produce careful readers, prayerful thinkers, and active participants in solving family, professional, religious, and social problems. They will then be like Abraham of old, who had been “a follower of righteousness, desiring also to be one who possessed great knowledge, and to be a greater follower of righteousness, and to possess a greater knowledge, . . . desiring to receive instructions, and to keep the commandments of God.” In this lifelong quest, they, like Abraham, will find “greater happiness and peace and rest” (Abraham 1:2). Thus a BYU diploma is a beginning, not an end, pointing the way to a habit of constant learning. In an era of rapid changes in technology and information, the knowledge and skills learned this year may require renewal the next. Therefore, a BYU degree should educate students in how to learn, teach them that there is much still to learn, and implant in them a love of learning “by study and also by faith” (D&C 88:118).

**2. Service.** Since a decreasing fraction of the Church membership can be admitted to study at BYU, it is ever more important that those who are admitted use their talents to build the kingdom of God on the earth. Hence, BYU should nurture in its students the desire to use their knowledge and skills not only to enrich their own lives but also to bless their families, their communities, the Church, and the larger society. Students should learn, then demonstrate, that their ultimate allegiance is to higher values, principles, and human commitments rather than to mere self-interest. By doing this, BYU graduates can counter the destructive and often materialistic self-centeredness and worldliness that afflict modern society. A service ethic should permeate every part of BYU’s activities - from the admissions process through the curriculum and extracurricular experiences to the moment of graduation. This ethic should also permeate each student’s heart, leading him or her to the ultimate wellspring of charity--the love for others that Christ bestows on his followers.

## Conclusion

*Education is a good thing, and blessed is  
the man who has it, and can use it for the dissemination  
of the Gospel without being puffed up with pride.  
--Brigham Young <sup>12</sup>*

These are the aims of a BYU education. Taken together, they should lead students toward wholeness: “the balanced development of the total person” (Mission Statement). These aims aspire to promote an education that helps students integrate all parts of their university experience into a fundamentally sacred way of life--their faith and reasoning, their knowledge and conduct, their public lives and private convictions. Ultimately, complete wholeness comes only through the Atonement of him who said, “I am come that they might have life, and that they might have it more abundantly” (John 10:10). Yet a university education, guided by eternal principles, can greatly “assist individuals in their quest for” that abundant “eternal life” (Mission Statement).



A commitment to this kind of education has inspired the prophets of the past to found Church schools, like BYU, on the principle that “to be learned is good if they hearken unto the counsels of God” (2 Nephi 9:29). These prophets have known the risks of such an enterprise, for “that happiness which is prepared for the saints” shall be hid forever from those “who are puffed up because of their learning, and their wisdom” (see 2 Nephi 9:42-43). Yet they have also known that education plays a vital role in realizing the promises of the Restoration; that a broad vision of education for self-reliance and personal growth is at the very heart of the gospel when the gospel is at the heart of education. To the degree that BYU achieves its aims, the lives of its students will confirm Brigham Young’s confidence that education is indeed “a good thing,” blessing all those who humbly and faithfully use it to bless others.

## Notes

1. Brigham Young, quoted by George H. Brimhall in “The Brigham Young University,” *Improvement Era*, vol. 23, no. 9 (July 1920), p. 831.
2. Brigham Young, in Reinhard Maeser, *Karl G. Maeser: A Biography* (Provo: Brigham Young University, 1928), p. 79.
3. Spencer W. Kimball, “Education for Eternity,” *Preschool Address to BYU Faculty and Staff*, 12 September 1967, p. 11.
4. Joseph Smith, *Teachings of the Prophet Joseph Smith*, sel. Joseph Fielding Smith (Salt Lake City: Deseret Book Company, 1972), p. 137.
5. Brigham Young, *Journal of Discourses* (hereafter JD), vol. 10 (London: Latter-day Saints’ Book Depot, 1854-86), p. 224.
6. Brigham Young, JD 8:32.
7. David O. McKay, “Why Education?” *Improvement Era*, vol. 70, no. 9 (September 1967), p. 3.
8. Spencer W. Kimball, “On My Honor,” in *Speeches of the Year 1978* (Provo: Brigham Young University Press: 1979), p. 137.
9. Spencer W. Kimball, “Second Century Address and Dedication of Carillon Tower and Bells,” *Brigham Young University*, 10 October 1975, p. 12.
10. Brigham Young, JD 3:203.
11. Brigham Young, JD 14:83.
12. Brigham Young, JD 11:214.

## Honor Code

We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men. . . . If there is anything virtuous, lovely, or of good report or praiseworthy, we seek after these things (Thirteenth Article of Faith).

As a matter of personal commitment, faculty, administration, staff, and students of Brigham Young University, Brigham Young University—Hawaii, Brigham Young University—Idaho, and LDS Business College seek to demonstrate in daily living on and off campus those moral virtues encompassed in the gospel of Jesus Christ, and will

Be honest  
Live a chaste and virtuous life  
Obey the law and all campus policies  
Use clean language  
Respect others  
Abstain from alcoholic beverages, tobacco, tea, coffee, and substance abuse  
Participate regularly in church services  
Observe the Dress and Grooming Standards  
Encourage others in their commitment to comply with the Honor Code

Specific policies embodied in the Honor Code include (1) the Academic Honesty Policy, (2) the Dress and Grooming Standards, (3) the Residential Living Standards, and (4) the Continuing Student Ecclesiastical Endorsement. (Refer to institutional policies for more detailed information.)



## FROM THE PRESIDENT

**W**elcome to Brigham Young University. This catalog contains information about BYU's graduate degree requirements, policies, and course offerings, as well as the University's distinctive mission, which reflects the values of our sponsoring institution, The Church of Jesus Christ of Latter-day Saints.

BYU's graduate study programs are designed to provide a depth of disciplinary knowledge, a breadth of scientific and creative discovery, and the rigor of individual and collective investment where teachers and students work together as partners in significant endeavors. Through graduate study, you become not only a consumer of, but also a contributor to, the world's store of knowledge. Please take advantage of the tremendous resources available to you on campus. Through devoted study, observation, and contemplation, your disciplinary skills will be expanded and enhanced, and your life will be changed forever.

We are delighted that you have chosen to pursue your graduate studies here. May your experience provide not only the opportunity, but also the ability, to make a difference in the world. Best wishes as you begin this new journey of discovery and enlightenment.

A handwritten signature in black ink that reads "Kevin Worthen". The script is fluid and cursive, with the first name "Kevin" and last name "Worthen" clearly legible.

Kevin J Worthen

## CATALOG TERMS AND ABBREVIATIONS

The following terms and abbreviations are used throughout the catalog:

**Course Number.** This catalog does not list courses numbered below 500. For listings of undergraduate courses, see the BYU Undergraduate Catalog. Courses numbered below 500 are undergraduate courses, courses numbered 500–599 are either graduate courses or advanced undergraduate courses, and courses numbered 600 and above (600–799) are graduate courses. Most, but not all, 500-level courses can count toward a graduate degree.

**R.** An R following the course number designates a course that may be repeated for credit.

**Credit Hour Designation.** The number that follows each course title is the number of semester hours of credit designated for the class.

Areas of Study.....	Abbreviations
Accounting .....	Acc
Anthropology.....	Anthr
Art .....	Art
Art Education.....	Arted
Biology.....	Bio
Chemical Engineering .....	Ch En
Chemistry and Biochemistry.....	Chem
Civil and Environmental Engineering .....	CE En
Communication Disorders .....	ComD
Communications .....	Comms
Comparative Arts and Letters	
Art History and Curatorial Studies .....	Arthc
Comparative Studies .....	Cmpst
Computer Science .....	C S
Counseling Psychology and	
Special Education.....	CPSE
Economics.....	Econ
Educational Leadership and	
Foundations.....	EdLF
Electrical and Computer Engineering.....	EC En

English.....	Engl
Exercise Sciences .....	ExSc
School of Family Life	
Marriage and Family Therapy.....	MFT
Marriage, Family, and Human	
Development.....	MFHD
Geological Sciences .....	Geol
Health Science .....	Hlth
Information Systems.....	I Sys
Instructional Psychology and	
Technology.....	IP&T
Language Studies .....	SLaT
Languages	
Arabic.....	Arab
Chinese.....	Chin
French.....	Fren
German.....	Germ
Greek.....	Greek
Hebrew.....	Heb
Italian .....	Ital
Latin .....	Latin
Portuguese.....	Port
Russian.....	Russ
Spanish.....	Span
Law School.....	Law
Linguistics and English Language.....	Ling
English Language.....	ELang
Teaching English to Students	
of Other Languages .....	TESOL
Management.....	Mgt
Mathematics.....	Math
Mathematics Education .....	MthEd
Mechanical Engineering.....	Me En
Microbiology and Molecular	
Biology .....	MMBio
Music .....	Music
Neuroscience Center.....	Neuro
Nursing .....	Nurs
Nutrition, Dietetics, and Food	
Science .....	NDFS
Physics and Astronomy .....	Phscs



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Physiology and Developmental	
Biology .....	PDBio
Plant and Wildlife Sciences .....	PWS
Psychology .....	Psych
Public Management .....	P Mgt
Recreation Management .....	RMYL
Religious Education .....	Rel E
Ancient Scripture .....	Rel A
Church History and Doctrine .....	Rel C
Social Work .....	Soc W
Sociology .....	Soc
Statistics .....	Stat
Teacher Education .....	T Ed
Elementary Education .....	El Ed
Secondary Education .....	Sc Ed
School of Technology	
Construction Management .....	CM
Information Technology .....	IT
Manufacturing Engineering	
Technology .....	Mfg
Technology .....	Tech
Theatre and Media Arts .....	TMA

## COLLEGES AND SCHOOLS

### EDUCATION, DAVID O. MCKAY SCHOOL OF

301 MCKB  
Provo, UT 84602-5095  
(801) 422-3694

**Dean:** Mary Anne Prater, Professor, Counseling Psychology and Special Education  
**Associate Dean, Graduate Studies:** Tina Dyches, Associate Professor, Counseling Psychology and Special Education

The departments in the McKay School of Education offer the following graduate degrees:

#### **Communication Disorders**

MS Communication Disorders

#### **Counseling Psychology and Special Education**

MS Special Education

EdS School Psychology

PhD Counseling Psychology

#### **Educational Leadership and Foundations**

MEd, EdD Educational Leadership

#### **Instructional Psychology and Technology**

MS, PhD Instructional Psychology and Technology

#### **Teacher Education**

MA Teacher Education

**The following college-wide degree is available through the McKay School of Education**

PhD Education Inquiry Measurement and Evaluation

### ENGINEERING AND TECHNOLOGY, IRA A. FULTON COLLEGE OF

270 CB  
Provo, UT 84602-1345  
(801) 422-4101

**Dean:** Alan R. Parkinson, Professor, Mechanical Engineering

**Associate Dean, Graduate Studies:** David Long, Professor, Electrical Engineering

The departments and school in the College of Engineering and Technology offer the following graduate degrees:

#### **Chemical Engineering**

MS, PhD Chemical Engineering

#### **Civil and Environmental Engineering**

MS, PhD Civil Engineering

#### **Electrical and Computer Engineering**

MS, PhD Electrical and Computer Engineering

#### **Mechanical Engineering**

MS, PhD Mechanical Engineering

#### **Technology, School of**

MS Technology

**FAMILY, HOME, AND SOCIAL SCIENCES,  
COLLEGE OF**

990 SWKT  
Provo, UT 84602-5535  
(801) 422-2083

**Dean:** Benjamin M. Ogles, Professor, Psychology  
**Associate Dean, Graduate Studies and**

**Curriculum:** Susanne Olsen Roper, Associate  
Professor, Family Life

**Associate Dean, Research:** Shawn Miller, Associate  
Professor, History

The College of Family, Home, and Social Sciences  
offer the following graduate degrees:

**Anthropology**

MA Anthropology  
Cert Museum Practices

**Family Life, School of**

MS, PhD Marriage, Family, and Human  
Development

MS, PhD Marriage and Family Therapy

**Psychology**

PhD Clinical Psychology  
PhD Psychology

**Social Work, School of**

MSW Social Work

**Sociology**

MS Sociology

**FINE ARTS AND COMMUNICATIONS,  
COLLEGE OF**

A-501 HFAC  
Provo, UT 84602-6302  
(801) 422-2819

**Dean:** Ed Adams, Professor, Communications  
**Associate Dean:** Jeremy Grimshaw, Associate  
Professor, Music

The departments and school in the College of Fine  
Arts and Communications offer the following  
graduate degrees:

**Communications**

MA Mass Communications

**Music, School of**

MA, MM Music

**Theatre and Media Arts**

MA Theatre and Media Arts

**Visual Arts**

MA Art Education  
MFA Studio Art



## HUMANITIES, COLLEGE OF

4002 JFSB  
Provo, UT 84602-6704  
(801) 422-2775

*Dean:* Scott Miller, Asian and Near Eastern Languages

*Associate Dean:* George Handley, Professor, Humanities

*Associate Dean:* Ray T. Clifford, Director, Center for Language Studies

*Associate Dean:* Scott Sprenger, Professor, French and Italian

The departments in the College of Humanities offer the following graduate degrees:

### Art History and Curatorial Studies

MA Art History and Curatorial Studies

### English

MA English

MFA Creative Writing

### French and Italian

MA French Studies

### Comparative Arts and Letters

MA Comparative Studies

### Center for Language Studies

MA Second Language Teaching (SLaT)

### Linguistics and English Language

MA Linguistics

MA Teaching English to Speakers of Other Languages

### Spanish and Portuguese

MA Portuguese

MA Spanish

## LAW SCHOOL, J. REUBEN CLARK

341 JRCB  
Provo, UT 84602-8000  
(801) 422-4274

*Dean:* James Rasband, Professor of Law, International and Environmental Law

*Associate Dean:* D. Gordon Smith, Professor of Law, Business Associations

*Assistant Dean:* Brett G. Scharffs, Professor of Law, Business Organizations

*Assistant Dean:* Michelle Mumford

### Juris Doctorate (JD)

The J. Reuben Clark Law School offers a six-semester course of graduate professional study leading to the juris doctorate (JD) degree. Information about legal education, admissions standards and procedures, and related matters can be obtained from the admissions office of the Law School, 340 JRCB, Provo, UT, 84602-8000, or by visiting the Law School's website located at [www.law2.byu.edu/admissions/newstudents.php](http://www.law2.byu.edu/admissions/newstudents.php).

### Master of Law (LLM)

The master of law (LLM) degree is conferred upon successful completion of a minimum 24 credit hours earned during at least two semesters in residence following completion of a JD degree or its equivalent outside the United States. Information and applications are available through the admissions office of the Law School, 340 JRCB, Provo, UT 84602-8000, or by visiting the Law School's website at [www.law2.byu.edu/admissions/newstudents.php](http://www.law2.byu.edu/admissions/newstudents.php).

## LIFE SCIENCES, COLLEGE OF

5000 LSB  
Provo, UT 84602-5250  
(801) 422-3963

**Dean:** James P. Porter, Professor, Physiology and  
Developmental Biology

**Associate Dean, Graduate Studies:** Michael D.  
Barnes, Professor, Health Science

The departments in the College of Life Sciences offer  
the following graduate degrees:

### **Biology**

MS Biological Science Education  
MS, PhD Biology

### **Exercise Sciences**

MS, PhD Exercise Sciences

### **Health Science**

MPH Public Health

### **Microbiology and Molecular Biology**

MS, PhD Microbiology and Molecular Biology

### **Nutrition, Dietetics, and Food Science**

MS Food Science  
MS Nutritional Science

### **Physiology and Developmental Biology**

MS, PhD Neuroscience  
MS, PhD Physiology and Developmental  
Biology

### **Plant and Wildlife Sciences**

MS Environmental Science  
MS Genetics and Biotechnology  
MS, PhD Wildlife and Wildlands Conservation

## MANAGEMENT, MARRIOTT SCHOOL OF

730 TNRB  
Provo, UT 84602-3113  
(801) 422-4121

**Dean:** Lee Perry, Professor, Business

**Associate Dean:** Michael P. Thompson, Associate  
Professor, Organizational Leadership and  
Strategy

The Marriott School includes five professional  
programs:

### **Accountancy**

MAcc Professional Accountancy  
MAcc Tax

### **Business Administration**

MBA, EMBA Business Administration

### **Information Systems**

MISM Information Systems Management

### **Public Management, Romney Institute of**

MPA, EMPA Public Administration

### **Recreation Management**

MS Recreation Management

**NURSING, COLLEGE OF**

400 SWKT  
Provo, UT 84602-5532  
(801) 422-4144

**Dean:** Patricia K. Ravert, Professor  
**Associate Dean, Graduate Affairs:** Mary Williams,  
Associate Professor, Nursing

The College of Nursing offers a nationally accredited program leading to the Master of Science degree.

MS Nursing

**PHYSICAL AND MATHEMATICAL SCIENCES,  
COLLEGE OF**

N-181 ESC  
Provo, UT 84602-4605  
(801) 422-2674

**Dean:** Scott D. Summerfeldt, Professor, Physics  
**Associate Dean:** Tom Sederberg, Professor,  
Computer Science  
**Associate Dean:** Bart J. Kowallis, Professor,  
Geological Sciences

The departments in the College of Physical and Mathematical Sciences offer the following graduate degrees:

**Chemistry and Biochemistry**

MS, PhD Biochemistry  
MS, PhD Chemistry

**Computer Science**

MS, PhD Computer Science

**Geological Sciences**

MS Geology

**Mathematics**

MS, PhD Mathematics

**Mathematics Education**

MA Mathematics Education

**Physics and Astronomy**

MS, PhD Physics  
PhD Physics and Astronomy

**Statistics**

MS Statistics

## RELIGIOUS EDUCATION

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### RELIGIOUS EDUCATION

370 JSB

Provo, UT 84602-5693

(801) 422-2735

*Dean:* Brent Top, Professor, LDS Doctrine

*Associate Dean:* Dana Pike, Professor, Near Eastern  
Studies

*Associate Dean:* Robert Freeman, Professor, 20th  
Century Church History

Religious Education offers the following graduate  
degrees:

MA Religious Education

MA Religious Studies-Military Chaplaincy



## ACCOUNTANCY

**Director:** Wilks, T. Jeffrey  
**Associate Director:** Cottrell, David M.

560 TNRB, Provo, UT 84602-3068  
 (801) 422-3951  
[soa@byu.edu](mailto:soa@byu.edu)  
<http://marriottschool.byu.edu/macc>

### THE PROGRAMS OF STUDY

The School of Accountancy (SOA) administers one graduate program through the Marriott School: the Master of Accountancy-MAcc.

The Master of Accountancy program offers a general background in accounting, with an emphasis on business-related subjects and an in-depth study of one or more areas of accounting. The MAcc degree is awarded on completion of a professional program, which can begin as early as the junior year of the undergraduate program, and culminates in the Marriott School after the fifth year. Students entering the SOA program with a baccalaureate degree in accounting can complete the program in less than two years.

The objective of the program is to develop graduates who exhibit professionalism and are qualified with specialized knowledge in one or more accounting areas.

The School of Accountancy seeks to educate individuals who are:

- Imbued with a strong sense of professional commitment
- Qualified with specialized knowledge in the areas of accounting or tax
- Committed to continued professionalism-beyond formal education
- Capable of becoming leaders who exhibit high standards of ethical conduct within their chosen profession.

Two emphases are offered within the MAcc program: Professional Accountancy and Tax. The Professional Accountancy emphasis is designed for students who wish to gain a broad base of graduate accounting training. Students typically seek accounting positions in auditing, management, not-for-profit, or PhD programs. Tax emphasis graduates usually begin careers in the tax area of public accounting firms.

The School of Accountancy admits approximately 160 students per year into its graduate program.

### Accountancy - Tax - MAcc

**Common requirements:** Marriott School Graduate Core consisting of BUS M 520, 530, 540, 550, 581, 582.

**Tax:** ACC 503, 523, 560, 561, 562, 563, 566. MAcc elective: 3 hours from the Tax elective course list; Marriott School electives: 9 hours from the elective course list.

### Accountancy - Professional - MAcc

**Common requirements:** Marriott School Graduate Core consisting of BUS M 520, 530, 540, 550, 581, 582.

**Professional Accountancy:** ACC 515, 522, 525, 530, 531, 540, 541. Finance elective: MBA 621-629 (choose one); MAcc Electives: 6 hours from the Professional Accounting elective course list; Marriott School electives: 6 hours from the elective course list.

### FINANCIAL ASSISTANCE

The School of Accountancy utilizes the Marriott School's financial aid provisions. Qualified students can receive aid from the following: the Marriott School Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

**Scholarships.** The Marriott School of Management offers scholarships to Marriott School students through

the college, departments and programs. One application online at [marriottschool.byu.edu/aid](http://marriottschool.byu.edu/aid) allows students to apply for all scholarships the Marriott School offers.

**Assistantships.** Research and teaching assistantships are available for qualified second-year students.

**Loans.** Several loans are available for Marriott School students:

- Marriott School Loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU Short-Term Loans: available for up to the cost of tuition only.
- Federal Stafford Loans: subsidized by the U.S. government. Not available for international students. More information on and applications for these loans are available from the BYU Financial Aid Office, A-41 ASB, (801) 422-4104, e-mail: [financial\\_aid@byu.edu](mailto:financial_aid@byu.edu).

### RESOURCES AND OPPORTUNITIES

**The N. Eldon Tanner Building.** The Tanner Building, which houses the Marriott School, is one of the finest facilities of its kind. The original building with a dramatic seven-story atrium was recently updated with a new four-story addition. The addition boasts thirty-nine team study rooms, six large case rooms, the Blue Line Deli, and adds 76,000 square feet to the existing building.

**The Marriott School of Management.** The Marriott School is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships,

## ACCOUNTANCY

executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the Marriott School's National Advisory Council.

### **National Advisory Council.**

Consisting of more than 160 prominent business and government executives, the National Advisory Council lends major support to the Marriott School. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

**The Executives on Campus Program.** This program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and Entrepreneurship Lecture Series.

## COURSE DESCRIPTION

### **ACC**

#### **503.Advanced Financial Accounting. (3)**

Prerequisite(s): Marriott School Graduate Core.

Advanced financial accounting topics including pensions, earnings per share, accounting changes, and deferred income taxes.

#### **515.Accounting Research Seminar. (3)**

Prerequisite(s): Admission to MAcc.

Professional standards and professional literature of accounting and auditing; related academic research. Research tools, information technologies, and critical analysis emphasized.

#### **516.Introduction to Academic Research. (3)**

Prerequisite(s): Admission to the MAcc predoctoral track.

Fundamentals of academic research, including the scientific method, the philosophy of science, and the areas and methodologies of academic research.

#### **517.Academic Research Applications. (1)**

Prerequisite(s): ACC 516; Admission to the MAcc predoctoral track.

Basic SAS programming; practice using Compustat and CRSP databases; performing archival research.

#### **522.Advanced Taxation. (3)**

Prerequisite(s): Marriott School Graduate Core.

Tax laws as they apply to selected tax entities, with an introduction to tax research methodology.

#### **523.Tax Research Methodology. (3)**

Prerequisite(s): Admission to MAcc.

In-depth treatment of research and procedures emphasizing communication and presentation of findings.

#### **525.Accounting Information Systems Risk and Control. (3)**

Prerequisite(s): Admission to MAcc.

Understanding the risks involved in accounting information systems and the proper design, documentation, and validation of mitigating controls. Theory and application.

#### **530.Advanced Financial Statement Auditing. (3)**

Prerequisite(s): Admission to MAcc; Acc 515 or equivalent.

Accounting methodology, professional auditing standards, and current issues.

#### **531.Advanced Management Accounting. (1.5)**

Prerequisite(s): Marriott School Graduate Core; Acc 515 or equivalent.

Advanced concepts, including the role of accounting in strategic and operational decision-making.

#### **540.Advanced Professional Financial Accounting. (3)**

Prerequisite(s): Marriott School Graduate Core; Acc 515 or equivalent.

Advanced financial accounting topics including pensions, earnings per share, accounting changes, and deferred income taxes.

#### **541.Financial Statement Analysis. (1.5)**

Analysis of financial statements and the accompanying footnotes. How various accounting methods might affect interpretation and use of financial information.

#### **542.Fair Value and Other Measurements in Accounting. (3)**

Prerequisite(s): ACC 515 & ACC 530

Case-based course that examines theoretical and practical issues surrounding fair value and other measurement issues. Focuses on techniques used in practice for measuring financial instruments, acquisitions, revenue recognition, and asset impairments, among others.

**545.International Accounting and Multinational Enterprises. (3)**

Accounting from an international perspective: flow of information in multiple currencies, complying with reporting requirements, setting budgets and monitoring performance, and controlling corporate assets through reports and audits.

**550.Fraud Prevention and Detection. (3)**

Fraud prevention, detection, investigation, issues, and methodology. Examination of past frauds with hands-on cases and computer exercises to identify increased fraud risk, interrogate data, and design prevention and detection controls.

**555.Data Communications and Security. (3)**

Prerequisite(s): Admission to MAcc.

Principles of data communication and security, local- and wide-area networks, hardware, software, infrastructure, standards, policies, baseline security, web security, cryptography, operations, and security management.

**556.Database Analysis and Design. (3)**

Prerequisite(s): Admission to a Marriott School graduate program.

Concepts and techniques of database system development. Focal areas include: structures, integrity, retrieval, manipulation, validation, and analysis. SQL used as basis for data interrogation.

**557.Management Consulting and Projects. (3)**

Prerequisite(s): Admission to MAcc.

Projects-oriented course where students get hands-on experience performing consulting jobs for businesses in Utah. Class includes both in-class instruction and business experience.

**560.Special Problems in Federal Taxation. (3)**

Prerequisite(s): ACC 523

Special property transactions, accounting periods and methods, tax payments and credit, tax concepts, and reporting tax liability.

**561.Corporate Taxation 1. (3)**

Prerequisite(s): ACC 523

Federal income taxation of corporations and shareholders.

**562.Corporate Taxation 2. (3)**

Continuation of Corporate Taxation 1. Includes consolidated returns.

**563.Taxation of Partnerships. (3)**

Prerequisite(s): ACC 523

Federal income taxation of general and limited partnerships and partners.

**564.Taxation of Estates, Gifts, and Fiduciaries. (3)**

Prerequisite(s): ACC 523

Federal taxation of property transferred by death and gift; federal taxation of income of trusts and estates.

**565R.Current Tax Policy. (0.5-3)**

Prerequisite(s): ACC 523

Intensive study of special and current tax topics and policies.

**566.Tax Accounting Methods and Accounting for Income Taxes. (3)**

Prerequisite(s): ACC 523

Accounting periods and methods, corporate income taxation, and accounting for income taxes under ASC 740.

**568.Taxation of Foreign Income. (3)**

Prerequisite(s): Acc 561 or concurrent enrollment.

Federal taxation of foreign transactions.

**591R.Readings and Conference (1-3)**

Prerequisite(s): SOA director's consent.

In-depth study one-on-one with chosen professor on topic of mutual interest not currently covered in existing courses.

**599R.Academic Internship:**

**Accounting. (0.5-3)**

Prerequisite(s): Internship coordinator's consent.

On-the-job experience and training in industry, government, or public accounting firms.

**FACULTY**

**Barrick, John A.** *Associate Professor*, PhD, University of Nebraska, Lincoln, 1998. Tax

**Bingham, John** *Associate Professor*, PhD, Texas A&M University, 2005.

**Burton, F. Greg** *Professor*, PhD, University of South Carolina, 1994. Information Systems; Audit

**Christensen, Theodore E.** *Professor*, PhD, University of Georgia, 1995. Financial

**Cottrell, David M.** *Professor*, PhD, Ohio State University, 1992. Audit; Financial

**Drake, Michael S.** *Assistant Professor*, PhD, Texas A&M University, 2009. Financial

**Gardner, Robert L.** *Professor*, PhD, University of Texas, Austin, 1979. Tax

**Glover, Steven M.** *Professor*, PhD, University of Washington, 1994. Audit; Financial

**Heninger, William G.** *Associate Professor*, PhD, University of Georgia, 1997. Information Systems; Audit; Financial

**Prawitt, Douglas F.** *Professor*, PhD, University of Arizona, 1993. Audit

## ANTHROPOLOGY

**Smith, Steven D.** *Associate Professor*, PhD, University of Florida, 2005. Managerial

**Spilker, Brian C.** *Professor*, PhD, University of Texas, Austin, 1993. Tax

**Stewart, Bryan W.** *Assistant Professor*, PhD, University of South Carolina, 2013. Tax

**Stewart, Dave N.** *Professor*, PhD, University of Florida, 1980. Tax

**Stice, Earl Kay** *Professor*, PhD, Cornell University, 1988. Financial

**Stice, James D.** *Professor*, PhD, University of Washington, 1989. Financial

**Stocks, Kevin D.** *Professor*, PhD, Oklahoma State University, 1981. Managerial

**Summers, Scott L.** *Professor*, PhD, Texas A&M University, 1995. Information Systems

**Swain, Monte R.** *Professor*, PhD, Michigan State University, 1991. Managerial

**Tayler, William B.** *Associate Professor*, PhD, Cornell University, 2007. Managerial

**Wilks, Jeff** *Professor*, PhD, Cornell University, 1996. Financial

**Worsham, Ronald G.** *Associate Professor*, PhD, University of Florida, 1994. Tax

**Zimbelman, Mark F.** *Professor*, PhD, University of Arizona, 1996. Audit; Financial

## ANTHROPOLOGY

**Chair:** Nuckolls, Charles W.  
**Graduate Coordinator:** Allison, James R.

800 SWKT, Provo, UT 84602-5522  
(801) 422-3058  
<https://anthropology.byu.edu/Pages/Home.aspx>

### THE PROGRAMS OF STUDY

The graduate masters degree program in anthropology emphasizes archaeology. Additionally, the program offers students interested in professional training in museum studies the option to complete a Museum Studies Certificate in combination with their M.A. program in archaeological fieldwork.

Focusing on the emergence and development of hunter-gatherer and early farming communities in the western United States, as well as complex societies in Mesoamerica and the Near East, the program's strength is the diversity of research opportunities it affords students. These include research venues in the Great Basin and American Southwest regions of North America as well as Mesoamerica and the Near East. Museum internship opportunities are often available, both on and off campus, for students adding the Museum Certificate requirements to their program. Annual archaeology field schools focus on providing training in both survey and excavation, with an emphasis on detailed documentation, resolving field problems through hands-on mentored learning, data analysis, and reporting findings. The optional Museum Studies Certificate allows students hands-on professional training in all aspects of museum collections management, exhibition development, and museum public outreach.

Rather than emphasizing specialized or topical interests, the program equips each graduate student with the basic skills necessary for a future in professional archaeology

and/or museum studies, including preparation for continuance in academia through a subsequent Ph.D. degree in anthropology or archaeology, a career in public archaeology, or placement in a museum.

Up to six students are admitted to the graduate program each year. Most students take three years to complete the requirements. The total number of graduate students in the program varies from between 10 to 15 participants.

### Museum Practices - Certificate

#### Optional Additional Museum Practices Certificate

Students interested in the Museum Certificate Program apply online and must be accepted into the Anthropology M.A. or a cognate discipline. It is highly recommended that students apply for the Museum Certificate Program if they are interested in museum work, do not plan to continue in archaeology at the Ph.D. level, and/or are interested in archaeology and anthropology as academic disciplines but do not wish to pursue a career that requires field archaeology, excavation, and analysis.

- **Credit Hours (24):** 18 hours plus 6 hours of internship in an approved collections repository (Anthr 599R).
- **Required Core Courses:** Anthr 522, 524, 525, 526, 596, 599R. Anthr 524, 526, and 596 must be taken sequentially in the same academic year.
- **Additional Courses:** one approved elective (3 hours) selected from the following: Anthr 511, 512, 590; Hist. 696R; ArtHC 590R; or Hum 690R.



- **Examinations:** Successfully pass a benchmark review (also coordinated with the cognate master's departmental review) no later than completion of the Anthr 524 course. Completion of the master's degree in a cognate discipline such as anthropology, history, art education, or humanities.

## Anthropology - MA

**Total Credit Hours Required (30):** A minimum of 24 hours of course work plus 6 thesis hours (Anthr 699R); A minimum of 20 hours (of the 24 noted above) must be taken under the direct instruction of professional anthropologists at BYU or in another acceptable department at the university. Thesis, readings, internship, and individual work do not count toward these 20 hours. Required and additional courses are noted below.

**Required Core Courses:** 18 hours from Anthr 500, 501, 502, 512, 695R, 699R.

**Additional Courses:** 6 hours from Anthr 530-590R, electives.

**Examinations:** (A) Oral examinations in conjunction with the thesis proposal; (B) Oral presentation of thesis proposal; (C) Oral defense of written thesis.

**Final Written Thesis:** 6 hours of Anthr 699R and successful completion of a masters level thesis.

## FINANCIAL ASSISTANCE

The Department of Anthropology offers tuition assistance to all incoming graduate students. Additional support comes through assistantships, grants, and employment offered by the department and the Museum of Peoples and Cultures, but these funds are limited. The goal is to provide some support for as many students as possible rather than generously support only a few. The

Office of Public Archaeology (OPA) also regularly provides employment and valuable professional experience to students prepared to participate in contract archaeology projects.

## RESOURCES AND OPPORTUNITIES

**Museum of Peoples and Cultures.** Closely associated with the Anthropology Department, the Museum of Peoples and Cultures offers unique research opportunities for students and faculty, several of whom have research offices in the museum. Located south and west of the campus in Allen Hall, the museum holdings include important archaeological and ethnographic collections, some of which have not been systematically analyzed or published. These collections, which represent cultures of the Great Basin, the American Southwest, Mesoamerica, the Near East, and other parts of the world, provide material for thesis topics, museum certificate projects, professional publications, and academic credit. Publications produced by the Museum of Peoples and Cultures include a Technical Series, Occasional Papers, and a Popular Series. All publications are marketed by the University of Utah Press.

**Office of Public Archaeology.** Housed in the Museum of Peoples and Cultures at Allen Hall, the Office of Public Archaeology (OPA) is one of the most active archaeological contracting organizations in the intermountain area. OPA exists to enrich the experience of students who emphasize archaeology. Since its inception in 1980, OPA has carried out small and large-scale projects throughout Utah, including recent long-term projects in Capitol Reef National Park and the Grand Staircase-Escalante National Monument. OPA staff often participate in the department archaeological field school and regularly employ experienced students for projects. OPA research is authored by staff and students and

published in the Museum of Peoples and Cultures Technical Series and Occasional Papers.

**The New World Archaeological Foundation.** This foundation is a research institution focused on Formative Mesoamerican cultures, especially in Chiapas, Mexico. Established in 1952, the NWAF maintains a staff and research facilities in San Cristobal de las Casas, Chiapas. The NWAF publishes a monograph series (papers) to disseminate research findings. Graduate student opportunities through the foundation include laboratory research on campus and limited field work in Mexico and Guatemala.

**Charles Redd Center for Western Studies.** Established in 1972 under an endowment from Charles Redd, a prominent Utah stockman and philanthropist, the center is charged with promoting the study of all aspects of the American West. The center publishes a monograph series, assists faculty and student research through grants and fellowships, and sponsors lectureships each year.

Examples of Current Faculty and Graduate Student Research Topics: Recent projects have addressed: socio-political complexity in Chiapas and Guatemala; development of complex society among the Maya; hunter-gatherer strategies in the arid west; economic patterns in small-scale societies in the greater southwest, and Nabataean society in Syro-Palestine.

## COURSE DESCRIPTION

### ANTHR

**500.History of Archaeology. (3)**  
Prerequisite(s): Acceptance into the graduate program.

Historical approach to development of archaeological knowledge, method, and theory, emphasizing North America and individual contributions.

## ANTHROPOLOGY

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### **501.Current Archaeological Method and Theory. (3)**

Prerequisite(s): Acceptance into the graduate program.

Major developments in archaeological method and theory, emphasizing current perspectives.

### **502.Quantitative Methods for Anthropology. (3)**

Methods of organizing, exploring, and presenting data. Probability and statistical inference.

### **511.Museums and Cultures. (3)**

Museums in society. Cultural foundations of museum content and sociology of museum use. Analyzing museum studies literature. Visits to and critiques of area museums. Final projects in real museums in the region.

### **512.Heritage Resource Management. (3)**

Prerequisite(s): Admittance into graduate program in archaeology or certificate program in museum practices.

Legal and ethical issues for practicing archaeologists. Preservation law, collections law, public archaeology, Native American issues, and careers in archaeology and museums.

### **522.Museum Practices and Technologies. (3)**

Core museum disciplines: collections management, curation, education, exhibition, and conservation. Supporting technologies: database, digital photography, Web design, etc. Career paths.

### **524.Museology: Curation and Writing. (3)**

Prerequisite(s): Admission to certificate in museum practices program.

Professional practices supporting the educational, research, and reporting functions of museums, emphasizing museum writing leading to publication, cataloguing, policy writing, exhibition conceptualization, etc.

### **525.Museum Registration and Collections Management. (3)**

Managing anthropological collections: object-handling, object-tracking, accessioning, deaccessioning, collections databases, loans, valuating collections, conservation environments, ethics, and NAGPRA and other laws relating to museums.

### **526.Museum Exhibitions and Programming. (3)**

Prerequisite(s): ANTHR 524

Instruction and practica in all aspects of exhibition development. Current thought and literature in museum education with practica for application.

### **530.Great Basin Archaeology. (3)**

Prerequisite(s): Anthr 350 or equivalent.

Overview of ethnography, history of research, and prehistory of the Great Basin culture area. Current issues in archaeological research emphasized.

### **535.Southwest Seminar. (3)**

Prerequisite(s): Anthr 350 or equivalent.

Overview of ethnography and prehistory of American Southwest. Current issues in archaeological research emphasized.

### **562.Formative Mesoamerica. (3)**

Topics and issues concerning beginnings and development of Mesoamerican civilizations. Mexican and Mayan antecedents of classic Mayan civilization and culture.

### **564.Classic Mayan Civilization. (3)**

Topics and issues concerning archaeological and cultural aspects of classic Mayan civilization and society.

### **565.Mayan Ceramic Analysis. (3)**

Current approaches to classification and analysis of archaeological ceramics, particularly Maya Lowland pottery. Laboratory study of pottery collections from the Maya area.

### **566.Mayan Ethnohistory. (3)**

Topics and issues of cultural change, colonization, and documentation of change processes in the Mayan region, from postclassic period and independence from Spain.

### **580.Near East Seminar. (3)**

Current issues in Near Eastern archaeological research.

### **590R.Special Topics. (3)**

Special topics in archaeology or museum studies.

### **596.Museum Projects. (3)**

Prerequisite(s): ANTHR 524 & ANTHR 526

One or more supervised museum projects, such as producing an exhibition, developing educational materials, conducting inventory, or accessioning collections.

### **599R.Academic Internship: Federal Agency on Museum/Collections Repository. (1-6)**

Prerequisite(s): Prior approval; completion of all course work for certificate in museum practices (may be taken concurrently with Anthr 596).

Earning credit while employed in federal agency archaeology (BLM, U.S. Forest Service, etc.); or 320 hours in collections-holding institution (sixteen weeks half-time; eight weeks full-time).

**694R.Readings.** (0.5-3)

Prerequisite(s): Supervising instructor's consent.

Reading about 1,000 pages per credit hour and providing required products.

**695R.Research.** (0.5-6)

Prerequisite(s): Completion of 18 hours of 500-level core curriculum for MA program.

Field research, data acquisition, and data analysis. Must be thesis related.

**699R.Master's Thesis.** (0.5-9)**FACULTY**

**Allison, James R.** *Associate Professor*, PhD, Arizona State University, 2000. Archaeology; Great Basin and Southwestern U; Ceramic Analysis; Quantitative Methods

**Clark, John E.** *Professor*, PhD, University of Michigan, 1994. Archaeology; Mesoamerica; Political and Economic Institutions; Cultural Evolution; Ancient Technology; Theory

**Crandall, David P.** *Associate Professor*, DPhil, Oxford University, 1993. Social Anthropology; South Africa; Kinship; Ritual and Symbols

**Finlayson, Cynthia S.** *Associate Professor*, PhD, University of Iowa, 1998. Ancient, Classical, and Islamic Archaeology and Art History; Archaeology of Syria and Jordan; Archaeology and Gender; Museum Studies (M)

**Forsyth, Donald W.** *Professor*, PhD, University of Pennsylvania, 1979. Mesoamerica; Ceramic Analysis; Ethno-history

**Hickman, Jacob** *Assistant Professor*, PhD, University of Chicago, 2011. Psychological anthropology; Southeast Asia; Hmong diaspora; Messianic religion; Ethnonationalism; Morality and personhood; Migration

**Johnson, David J.** *Associate Professor*, PhD, University of Utah, 1987. Archaeology; Archeometry; Ancient Trade; Near East

**Searcy, Michael T.** *Assistant Professor*, PhD, University of Oklahoma, 2010. Archaeology; U, Southwest/Northwest Mexico; Long-distance interaction; Sociopolitical organization; Maya ethnoarchaeology

**ART**

**Chair:** Barton, Garold C.

**Graduate Coordinator:** Johnson, Mark J.

E-509 HFAC, Provo, UT 84602-6414  
(801) 422-4429  
<http://visualarts.byu.edu/>

**THE PROGRAMS OF STUDY**

Two postgraduate degrees are offered in the Department of Visual Arts: Art Education-MA and Studio Art-MFA. Each requires practicing the component disciplines of art, as well as acquiring certain skills, knowledge, and understandings.

These strong graduate programs examine and promote the study, creation, and teaching of the visual arts, historically and from contemporary perspectives. Faculty in each area are recognized leading practitioners as well as students of the theoretical, philosophical, and professional issues of their respective academic specialties. The academic thrust of graduate studies in the Department of Arts provides a rich blend of the theoretical and the practical for a balanced understanding of art. High standards for study and practice in each degree program promote the high levels of professional practice and accomplishment expected of and achieved by our graduates.

The average number of students in each program and the duration of each program is as follows:

- Art Education: twelve students as a cohort group in program; two years to completion.
- Studio Art: fourteen students in program; two years to completion.

**Studio Art - MFA**

The MFA in art, a terminal degree, is dedicated to generating artists with significant skills and understandings that can influence the discipline. In alignment with current trends in art, the program accommodates and

nurtures students working in any medium or discipline, including but not limited to: Painting, Drawing, Printmaking, Ceramics, Sculpture, Photography, Video, Performance, Installation, Digital and New Media. Program requires 60 credit hours.

#### Requirements for Degree.

- Credit hours: MFA degree (60 hours): minimum 58 hours of approved course work, plus 2 hours of final project report.
- Time limitations: the degree is a three-year program and must be completed within five years. After three years of residency there is no guarantee of financial assistance or studio privileges.
- Course requirements: VASTU 640 (2), Art Theory (VASTU 510, 626, 695R) (12), VASTU 619R (4). Studio emphasis (34 hours): from VASTU 680R; 694R, Electives (6 hours). Participate in two travel study activities. 699R, Thesis (6 hours, was offered under VASTU 698R but is now VASTU 699R). (Program of Study is required at the beginning of second full semester. Participation in one per year off campus exhibition (proposed, invitational, or competitive).
- Evaluations: Two full faculty reviews are required: the first upon completion of first two semesters, near the end of Winter Semester; and the second review to be held in November of the third semester of study. After a successful second review, the student is required to enroll (with their advisor) in at least 1 hour of VASTU 699R every semester until completion of final project and thesis report.
- Oral defense and examination of final project: the candidate must engage his or her committee for the oral defense after installation of the final project and completion of the final project report. Defense must be scheduled at least two weeks prior.

- Final project: to be produced and exhibited in the format of a solo exhibition.
- Final project report: candidates will submit a written final project report.

#### Art Education - MA

The MA in art education is a cohort program intended for teachers who desire intensive curriculum development, professional development, and additional content and skills in the disciplines of a comprehensive art program. This program prepares students to pursue a PhD or EdD in art education if that is their intention. The MA in art education can also contribute to K-12 licensure requirements for graduate students who are interested in teaching art. In addition to reviewing research literature in art education, this program has a rigorous studio practice component designed to integrate teaching and artistic practice.

#### Requirements for Degree.

- Credit hours (36 hours): minimum 30 course-work hours plus 6 thesis hours. Course work hours primarily from 500- and 600-level courses (no more than 9 hours of 300- or 400-level courses may apply).
- Course requirements: 15 hours of core art education seminar (VAEDU 678R); 12 hours of VAEDU 578R (3 hours of digital art; 9 hours of studio art); 3 hours of art history courses; 6 thesis hours (VAEDU 699R).
- Select graduate committee and submit study list no later than second week of second semester.
- Examinations: comprehensive examination and oral defense of thesis.

#### FINANCIAL ASSISTANCE

Financial assistance is available through tuition scholarships, supplemental awards, and teaching assistantships.

#### RESOURCES AND OPPORTUNITIES

**Museum of Art.** BYU's Museum of Art provides a rich and diverse environment for the presentation and research of art and the various disciplines related to its analysis, theory, history, display, and reception. Whether it is an individual work, a collection, or an entire exhibition, students are encouraged to look, reflect, analyze, challenge, and enjoy.

Faculty and students engage collaboratively with the museum in projects that yield exhibitions, texts, documentaries, and other forms of presentation. Major exhibitions from its own collection of over 15,000 works and from other important collections are brought to the museum to provoke inquiry and to contribute to the university's academic discourses. Lectures, conferences, performances, and other educational experiences occur regularly in the museum's varied and versatile spaces.

**Art Studio Space.** Studio space is provided for graduate students in all emphasis areas.

**Art Resource Center.** The center is an important library resource for graduate study of content, methods of inquiry, and methodology in the visual arts disciplines intrinsic to current art education programs. A wide variety of books, journals, art reproductions, curricula, and other visual materials and aids are available.

**Art History Visual Resource Library.** The library is a teaching resource providing images and reference materials primarily for the Visual Arts faculty and instructors and has been built to support the Visual Arts Department curriculum. Along with the traditional slide collection, a digital database for the approximately 10,000 digital images is currently in process and new digital images are added constantly. In addition, there are several image resources available through the Harold B. Lee Library, including



ArtSTOR and 32,000 licensed images from Saskia. There are opportunities for graduate students to work in the Visual Resources Center on assistantships to further enhance their graduate learning experience by working on database projects with professors to develop new collections for teaching and research.

## COURSE DESCRIPTION

### ART

#### 610.Art Theory Context. (3)

Reviewing and critiquing major theoretical approaches in art history, emphasizing the space of display, the museum, and the work's social reception.

#### 619R.Studio Methodologies Seminar. (1)

Seminar instruction and individual studio critiques from visiting artists.

#### 626.Current Art Practice. (3)

Current issues in art.

#### 640.Graduate Business Practices. (2)

Business practices and theories associated with managing a career in art.

#### 680R.Studio Methodologies. (1-6)

Individual studio experience from selected faculty.

#### 694R.Special Problems. (0.5-3)

Prerequisite(s): Instructor's and committee consent.

#### 695R.Theory-Based Directed Studies. (3)

Prerequisite(s): Graduate status.

Trends in the visual arts; theory-based readings, writing, and art practice.

#### 699R.Master's Thesis. (0-6)

Prerequisite(s): Graduate student status and successful completion of preliminary exhibit.

Written report that places final exhibition in a contextual setting and defines, defends, and justifies its existence. Report clarifying how exhibit verifies original proposal.

### ARTED

#### 578R.Art Education Studio. (3)

Prerequisite(s): Graduate student status.

MA courses in ceramics, drawing, figure drawing, oil painting, aqueous painting, printmaking, crafts, sculpture, digital art, and conceptual art media.

#### 578R.MA Ceramics. (3)

#### 578R.MA Drawing. (3)

#### 578R.MA Figure Drawing. (3)

#### 578R.MA Oil Painting. (3)

#### 578R.MA Aqueous Painting. (3)

#### 578R.MA Printmaking. (3)

#### 578R.MA Sculpture. (3)

#### 578R.MA Crafts. (3)

#### 678R.Art Education Seminar: Issues and Trends. (3)

Seminar topics emphasizing issues and trends in art education. Topics investigated, discussed, and evaluated, depending on student needs.

#### 699R.Master's Thesis. (0.5-6)

## FACULTY

**Adams, Paul** *Associate Professor*, MFA, Utah State University, 1996. Photography

**Andersen, Bethanne** *Professor*, MFA, Brigham Young University, 1979. Illustration

**Barney, Daniel T.** *Assistant Professor*, PhD, University of British Columbia, 2009. Art Education, Qualitative Research Methodologies and Strategies, Pedagogy and Curriculum Studies

**Barrett, Robert** *Professor*, MFA, University of Iowa, 1976. Illustration

**Barton, Garold C.** *Professor*, MFA, Ohio State University, 1994. Printmaking

**Buehler, Fidalis** *Assistant Professor*, MFA, Brigham Young University, 2007. Studio Arts, Painting Emphasis

**Brinkerhoff, Val** *Associate Professor*, MFA, Utah State University, 1987. Photography

**Christensen, Brian D.** *Associate Professor*, MFA, Washington University, St. Louis, 1992. Ceramics

**Draper, Bryon** *Associate Professor*, MFA, Brigham Young University, 1995. Sculpture

**Everett, Peter** *Associate Professor*, MFA, Pratt Institute, 2000. Painting

**Gillett, Eric** *Associate Professor*, MFA, University of Utah, 2003. Graphic Design

**Graham, Mark A.** *Professor*, EdD, Teachers College of Columbia University, 2001. Curriculum and Teaching

## BIOLOGY

**Jensen, Heather Belnap** *Associate Professor*, PhD, University of Kansas, 2007. Nineteenth- and Early Twentieth-Century European Art and Culture: Gender Studies: Critical Theory

**Johnson, Mark J.** *Professor*, PhD, Princeton University, 1986. History of Roman, Early Christian, Byzantine, and Medieval Art and Architecture

**Magleby, Mark A.** *Museum of Art Director*, PhD, Ohio State University, 2009. Eighteenth Century Art and Architecture and Garden History, Twentieth Century European Art, Contemporary Theory and Criticism,

**Ostraff, Joseph E.** *Professor*, MFA, University of Washington, 1982. Painting

**Peacock, Martha** *Professor*, PhD, Ohio State University, 1989. History of Netherlandish Art

**Reynolds, Linda** *Professor*, MFA, University of Utah, 1993. Graphic Design

**Swensen, James** *Assistant Professor*, PhD, University of Arizona, 2009. American Art and Architecture, History of Photography

**Taylor, Sunny Belliston** *Assistant Professor*, MFA, Ohio State University, 2007. Painting and Drawing

## BIOLOGY

**Chair:** Shiozawa, Dennis K.  
**Graduate Coordinator:** Adams, Byron J.

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### THE PROGRAMS OF STUDY

The Department of Biology offers graduate training experiences in a variety of areas, including evolutionary biology, ecology, systematics, bioinformatics, conservation biology, and molecular evolution. We integrate approaches from the molecular and genetic levels, through the organismal level, to the population and ecosystem level to investigate a variety of questions in these areas. Because of our integrative nature, we have substantial expertise in plant and animal (vertebrate and invertebrate) systems. Our program provides an exceptional graduate community, including master's students, doctoral students, and postdoctoral fellows.

The Department of Biology offers three graduate degree programs: Biological Science Education-MS, Biology-MS, and Biology-PhD.

The Department of Biology has a vibrant graduate program. Students working toward a master's degree generally complete all requirements within two years. PhD students, however, routinely require about five years to complete their doctoral program.

The current Graduate Student Handbook is available to view online at [biology.byu.edu](http://biology.byu.edu).

### Biology - MS

The MS degree in biology is designed to give students an opportunity to develop research projects within a hypothesis-testing framework, with a conceptual focus on some

aspect of ecological or evolutionary theory. Projects might include, but are not limited to, studies in population, community or ecosystem ecology, population or conservation genetics, phylogeography, molecular evolution, bioinformatics, or phylogenetic systematics. Students in any of these areas will present and defend a thesis based on original work. Because all such research is expected to be suitable for publication in peer-reviewed journals, thesis manuscripts are expected to be prepared for immediate submission to an appropriate journal.

### Requirements for MS Degree Programs in Biology:

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours; 20 hours must be in the 500-level series and above (can include 691R, 699R, etc.).
- Required courses: Bio 691R (Graduate Seminar two semesters); Bio 503 (Graduate Orientation) or equivalent. Additional courses as determined by student's advisory committee and approved by department graduate coordinator.
- Annual progress reviews by advisory committee and graduate committee.
- Presentation of research prospectus to advisory committee.
- Thesis: standard university thesis or journal publication format.
- Examinations: (A) coursework oral examination, (B) defense of research, and (C) oral defense of thesis.

### Biology - PhD

The PhD degree in biology is structured to challenge students to develop intellectual independence. This is demonstrated by designing and implementing a research project that requires substantial work on an important question in ecological or evolutionary theory, then analyzing and synthesizing results in a way that reflects the student's maturation

as a scholar. Projects might include, but are not limited to, studies in population, community or ecosystem ecology, population or conservation genetics, phylogeography, molecular evolution, bioinformatics, or phylogenetic systematics. Students will present and defend a dissertation project that includes chapters to be published as stand-alone manuscripts in appropriate scholarly journals.

#### **Requirements for PhD Degree Programs in Biology:**

- Credit hours: minimum 54 credit hours, including 18 hours of dissertation Bio 799R.
- Required courses: Bio 691R (Graduate Seminar two semesters); Bio 503 (Graduate Orientation) or equivalent. Additional courses as determined by student's advisory committee and approved by department graduate coordinator.
- Students who have earned a master's degree must complete at least 36 credit hours of additional graduate work at BYU beyond the master's degree.
- Annual progress reviews by advisory committee and graduate committee.
- Presentation of research prospectus to advisory committee.
- Dissertation: standard university dissertation or journal publication format.
- Examination: (A) comprehensive oral examination: grant proposal and literature review; (B) oral defense of research; and (C) oral defense of dissertation.

#### **Biological Science Education - MS**

The biological science education degree is designed to prepare students with advanced skills and knowledge for teaching in high schools and colleges. Students opting for this degree pursue original research and present results in formal thesis format. Since all research for this degree is expected to

be of publication quality, theses are usually prepared in a form suitable for immediate submission for review by an appropriate scholarly journal. This degree is not an alternative teacher certification program.

#### **Requirements for MS Degree Programs in Biological Science Education:**

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours; 20 hours must be in the 500-level series and above (can include 691R, 699R, etc.).
- Required courses: Bio 691R (Graduate Seminar two semesters); Bio 503 (Graduate Orientation) or equivalent. Additional courses as determined by student's advisory committee and approved by department graduate coordinator.
- Annual progress reviews by advisory committee and graduate committee.
- Presentation of research prospectus to advisory committee.
- Thesis: standard university thesis or journal publication format.
- Examinations: (A) coursework oral examination, (B) defense of research, and (C) oral defense of thesis.

#### **FINANCIAL ASSISTANCE**

Teaching and research assistantships are offered on a competitive basis by the department. PhD students are guaranteed a Teaching Assistant position for each semester enrolled while MS students are guaranteed TA employment for the Fall and Winter semesters.

Tuition assistance is also available for both the MS and PhD degrees. Master's students receive a \$1000 tuition award for Fall and Winter semesters, and PhD students are granted a full tuition waiver for all semesters enrolled.

#### **RESOURCES AND OPPORTUNITIES**

**DNA Sequencing Facility.** The DNA Sequencing Center was established to help researchers process DNA samples efficiently and economically. The center is equipped with an ABI 3730 96-capillary automated sequencer, an ABI 3100 16-capillary machine, and a 454 Pyrosequencer that run DNA sequences and microsatellite runs. Operated by a faculty director, a full-time manager, a part-time manager, and a number of undergraduate student assistants, the center is open for use by undergraduates, graduate students, faculty, and, through special arrangements, researchers from outside the university. The centralization of equipment and expertise has dramatically reduced the expense of DNA research while increasing the efficiency and quality of the data generated.

#### **M. L. Bean Life Science Museum.**

Extensive biological collections are housed in the M. L. Bean Life Science Museum and are available for supervised student research. Curators and their students often conduct fieldwork throughout the U.S. and in many other parts of the world.

**Electron Optics Laboratory.** In this lab, researchers can accomplish all standard electron optics procedures. The laboratory has transmission and scanning electron microscopes equipped with X-ray microanalysis capabilities, plus accessory equipment for freeze-fracture, freeze-drying, and necessary support facilities, including confocal laser scan microscopy.

#### **USDA Forest Service Shrub Science Laboratory.**

Housed on the BYU campus, this lab supports one of the finest research programs on native shrubs in the world. Here eleven PhD research scientists with adjunct faculty appointments work with BYU faculty members and graduate students. Laboratories, greenhouses, and gardens on campus and around the state support studies on desert shrubs.

## BIOLOGY

**Lytle Ranch Preserve.** Graduate students are able to do year-round research on desert plants and animals at the Lytle Ranch. This large preserve is located in the moderate desert climate of southwestern Utah. For access to the preserve, contact the M.L. Bean Life Science Museum at (801) 422-5052 or at secretary.museum@byu.edu.

**Opportunities.** On the Provo campus are greenhouses, gardens, an arboretum, a small animal vivarium, and a tissue culture room. Laboratory facilities include gas chromatography-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultra centrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectroscopy, flow cytometry, microarray scanners, plate readers, and many other items.

Faculty and graduate students are engaged in a number of significant and interesting research projects, funded both externally and internally. Some of these include the following: evolutionary and biochemical ecology; plant and animal systematics; bioinformatics; evolutionary and conservation biology; molecular evolution; phylogeography; population, community, and ecosystem ecology; biogeochemistry; evolution of development; marine and freshwater biology; biological science education; environmental science; and conservation of rare species.

## COURSE DESCRIPTION

### BIO

#### 503.Research Orientation. (1)

Introduction to graduate school and research techniques.

#### 510.Biological Systematics and Curation. (3)

Principles, methods, and tools of taxonomy and systematics as applied to species delimitation, specimen-based research, nomenclatural codes, and the curation of biological specimens.

#### 511.Lichenology. (3)

Classification, morphology, and ecology on lichens. Field trip required.

#### 512.Angiosperm Phylogeny. (3)

Prerequisite(s): Bio 430 or equivalent.

Description, classification, phylogeny, and geographic distribution of flowering plant families.

#### 525.Animal Disease, Biosecurity, and Zoonoses. (3)

Prerequisite(s): Bio 380 or instructor's consent.

Animal disease emphasizing prevention, organ systems affected, biosecurity, and zoonotic potential.

#### 541.Aquatic Entomology. (4)

Prerequisite(s): Bio 441 or equivalent.

Morphology, classification, biology, and functional ecology of aquatic insects. Field trips required.

#### 555.Evolutionary and Ecological Modeling. (2)

Prerequisite(s): Senior status in bioinformatics program or graduate status; Stat 511, 512, or equivalent; instructor's consent.

Using models in ecology. Practical experience in analytical, simulation, and agent-based models.

#### 556.Limnology. (3)

Prerequisite(s): Bio 350, Chem 106; or equivalents.

Lakes, reservoirs; their biota and physical/chemical properties.

**557.Stream and Wetland Ecology.** (4)  
Prerequisite(s): Bio 350, Chem 106; or equivalent.

Stream and wetland ecology; their biota and their physical/chemical properties.

#### 559R.Advanced Topics in Ecology and Evolution. (1-6)

Prerequisite(s): Instructor's consent.

Current topics in ecology, evolution, and systematics.

#### 559R.Physiological Ecology. (1-6)

Prerequisite(s): Instructor's consent.

#### 559R.Tropical Biology. (1-6)

Prerequisite(s): Instructor's consent.

#### 560.Population Genetics. (4)

Prerequisite(s): Bio 420 or equivalent.

Basic principles of population genetics applied to natural populations; drift, selection, and nonrandom mating; inferring population subdivision, migration, and gene flow.

#### 581.Transmission Electron Microscopy. (3)

Prerequisite(s): Instructor's consent.

Theoretical and practical transmission electron microscopy of biological, physical science, and engineering samples, emphasizing practical applications.

#### 640.Phylogenetic Systematics. (4)

Prerequisite(s): Bio 420 or equivalent.

Theoretical foundations of modern systematics, methods of phylogenetic inference, and discussion of contemporary literature.

#### 641.(Bio - MMBio) Molecular Evolution. (4)

Prerequisite(s): Bio 420 or equivalent.

Theoretical foundations of molecular evolution; molecular phylogenetics, estimates of population genetic parameters, gene duplication, horizontal gene transfer, rates of evolution, molecular clocks.



**652.Evolutionary Ecology.** (3)  
Prerequisite(s): Bio 350, 420; or equivalents.

Exploring the diversity of life by integrating ecological and evolutionary perspectives. Topics include theoretical population ecology, advanced evolutionary biology, and behavioral ecology.

**653.Community and Ecosystem Ecology.** (3)

Prerequisite(s): Bio 350, 420; or equivalents.

Integrating ecological and biogeochemical concepts to understand the structuring of biological communities and ecological systems. Topics include community assembly, trophic dynamics, systems biology, ecosystem services, and biodiversity-ecosystem function.

**679R.Advanced Topics in Science Education.** (3)

Current topics in biological science education.

**681R.Electron Microscopy Laboratory.** (1-6)

Prerequisite(s): Instructor's consent.

Advanced research in electron microscopy.

**691R.Graduate Seminar.** (0.5)

**694R.Special Problems in Biology.** (1-6)

Prerequisite(s): Supervisor's consent.

Independent student research under faculty supervision.

**695R.Practicum in Biology Teaching.** (4-8)

Curricula, principles, concepts, and experiences in teaching biology effectively.

**699R.Master's Thesis.** (1-9)

**799R.Doctoral Dissertation.** (1-9)

## FACULTY

**Adams, Byron J.** *Associate Professor*, PhD, University of Nebraska, 1998. Molecular Systematics, Evolutionary Ecology, Ecological Genomics

**Belk, Mark C.** *Professor*, PhD, University of Georgia, 1992. Evolutionary Ecology

**Bybee, Seth M.** *Assistant Professor*, PhD, University of Florida, 2008. Insect Phylogenetics and Evolution of Insect Visual Systems

**Gill, Richard A.** *Associate Professor*, PhD, Colorado State University, 1998. Ecosystem and Physiological Ecology

**Jensen, Jamie L.** *Assistant Professor*, PhD, Arizona State University, 2008. Biological Science Education

**Johnson, Jerald B.** *Associate Professor*, PhD, University of Vermont, 2000. Evolutionary Ecology

**Johnson, Leigh A.** *Professor*, PhD, Washington State University, 1996. Plant Systematics and Evolution

**Johnson, Robert L.** *Associate Research Professor*, PhD, Brigham Young University, 2008.

**Kauwe, John S. K.** *Assistant Professor*, PhD, Washington University in St. Louis, 2007. Genetic Architecture of Complex Human Diseases

**Koide, Roger T.** *Professor*, PhD, University of California, Berkeley, 1984. Physiological and Community Ecology of Plants and Fungi

**Nelson, C. Riley** *Professor*, PhD, Brigham Young University, 1986. Entomology, Ecology, Systematic Biology

**Peck, Steven L.** *Associate Professor*, PhD, North Carolina State University, 1997. Environmental Biostatistics, Biomathematics, Entomology

**Rader, Russell B.** *Professor*, PhD, Colorado State University, 1987. Freshwater Evolutionary Ecology

**Ridge, Perry G.** *Assistant Professor*, PhD, Brigham Young University, 2013. Bioinformatics, Computational Biology

**Roeder, Beverly L.** *Professor*, PhD, Pennsylvania State University, 1990. Anatomy; Physiology, Medicine and Surgery, Animal Health, Prevention and Diagnoses of Metabolic Disorders

**Rogers, Duke S.** *Professor*, PhD, University of California, Berkeley, 1986. Phylogenetic Systematics, Mammalogy, Rodent Disease Ecology

**Shiozawa, Dennis K.** *Professor*, PhD, University of Minnesota, St. Paul, 1978. Aquatic Ecology, Ichthyology

**Sites Jr., Jack W.** *Professor*, PhD, Texas A&M University, 1980. Evolutionary Genetics, Herpetology

**St. Clair, Larry L.** *Professor*, PhD, University of Colorado, 1984. Cryptogams, Environmental Biomonitoring

**Whipple, Clint J.** *Assistant Professor*, PhD, University of California, San Diego, 2006. Evolution of Plant Development

**Whiting, Michael F.** *Professor*, PhD, Cornell University, 1994. Entomology, Phylogenetic Theory and Practice

**Wilcox, Edward R.** *Research Associate Professor*, PhD, University of California, Davis, 1982. Human Genetics

### BUSINESS ADMINISTRATION

**Program Director:** Bingham, John

W437 TNRB, Provo, UT 84602-3131  
(801) 422-3500  
mba@byu.edu

#### THE PROGRAMS OF STUDY

The master of business administration program is administered by the Marriott School of Management. A two-year program designed to prepare the graduate student for a career in business, the program focuses on four areas: globalization, integration, technology, and entrepreneurship. Currently, the program presents a new and exciting approach to teaching business management. Courses are integrated across disciplines in order to use faculty expertise from different points of view. Concept days are alternated with case study days to improve practical application.

The MBA program attracts, admits and graduates students who are committed to BYU's unique mission. The purposes of the program include:

1. To help each student better understand that faith in the teachings of the restored gospel of Jesus Christ are relevant to professional life.
2. To develop in students those management skills that will assist them in becoming influential leaders in their homes, their churches, their communities, and their professions.
3. To expand students' visions of their possibilities for future professional and other endeavors.

The curriculum has been designed to achieve the twofold task of giving the student (1) a general management education and (2) depth in area(s) bearing specifically on personal professional interests.

Students choose from five designed majors: finance, marketing, global supply chain management, organizational behavior/human resource management (OB/HR), or entrepreneurship. Or they can design their own track to fit their career goals.

For the most recent and complete information visit our website: <http://mba.byu.edu>

A brief description of each track follows:

#### Finance

The finance track prepares students to work in corporate finance or with financial institutions. The corporate finance curriculum trains students for careers as financial analysts, controllers, and treasurers within large corporations. The financial institutions curriculum trains students for careers in investment banking, commercial banking, and securities management. The corporate finance curriculum is appropriate for students who seek general management positions with a strong finance background, whereas the financial institutions curriculum is more specialized and focused on positions in finance firms.

#### Marketing

The marketing major builds on proven industry experience and academic achievements in the areas of marketing information systems, international brand management, and market analysis. This track prepares students for employment in product/brand management, e-commerce/database marketing, and high-technology marketing.

#### Global Supply Chain Management

The supply chain is the complete sequence of companies and value-enhancing activities required to transform basic raw materials into useful products and services for customers. Successful companies effectively manage operations within the walls of their own organization. Global supply chain management is one of the fastest growing job markets for business graduates.

#### Organizational Behavior/Human Resource Management (OB/HR)

The OB/HR major provides the fundamentals to make organizations better through the strategic management of their most important asset-talented people. The OB/HR curriculum equips students with leading-edge theories and best practices, analytical and diagnostic skills, and tools to become more effective change agents in organizations. Career opportunities exist in corporate human resources roles, both in HR generalist roles (e.g., HR business partner) and in HR specialist roles (e.g., leadership development, executive compensation), as well as in organizational consulting.

#### Entrepreneurship

Students interested in pursuing an entrepreneurship major should be highly focused on creating new ventures or launching new products or divisions within larger organizations (intrapreneurship). The entrepreneurship major works closely with the Rollins Center of Entrepreneurship and Technology to provide our students internships, externships, seed funding, and a network of successful entrepreneurs (such as the Founders Organization) and venture seed groups to provide the necessary resources and relationships to successfully launch new ventures.

#### Business Administration - MBA

Requirements for Degree

Curriculum:

*First-year:* All entering MBA students are required to be enrolled in the management core classes during the first year (two 15-week semesters) of study. The Marriott School MBA program follows a strict lockstep format wherein first-year students enter the program in the fall, then take all their classes together during the first year. **Because of the intensity of the courses and the number of hours spent in**

**group work outside the class room, students cannot work during the first year of the program.**

*Second-year:* During their second year, students are free to choose from a variety of elective courses to fulfill their chosen majors within the MBA program.

### ***Business Administration - Executive Program - MBA***

#### **Business Administration - Executive Option**

The executive masters of business administration option is a rigorous program in general management for fully employed professionals. Designed for managers and professionals who typically have at least five years of full-time managerial work experience, it consists of courses similar to the full-time MBA program but is unique in reflecting the work and management experience of its students. The Executive MBA is a general degree and does not offer specialization in functional areas.

All Executive MBA classes are offered at the BYU Salt Lake Center in downtown Salt Lake City in a weekend format. Classes are held every other weekend on Friday from noon to 6:30 p.m. and on Saturday from 8 a.m. to 3 p.m.

Obtaining an MBA degree through the executive MBA option requires a year-round commitment for two years. Students spend one residency week on campus at the beginning of each school year in a complex case analysis and other concentrated study. Executive MBA classes are not available to students outside the Executive MBA program.

### **FINANCIAL ASSISTANCE**

The MBA program utilizes the Marriott School's financial aid provisions. Qualified students can receive aid from the Marriott School of Management Scholarship Fund, private scholarship donations, and loan assistance.

#### **Scholarships**

The Marriott School currently has over ninety private scholarships. On-line applications for these scholarships are made available to second-year, full-time MBA students in January (deadline March 31).

In addition to these private scholarships, the full-time MBA program awards scholarship funds to first-year students based on academic merit, work experience, and diverse life experiences.

#### **Assistantships**

Second year students can apply for research and teaching assistantships at the end of their first year.

#### **Loans**

Several loans are available for Marriott School students:

- Marriott School loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU short-term loans: available for up to the cost of tuition only.
- Federal Stafford loans: subsidized by the U.S. government. Not available for international students.

We invite you to visit the financial aid website at <http://scholarships.byu.edu> for detailed information as well as to access financial aid applications.

### **RESOURCES AND OPPORTUNITIES**

Business administration students utilize the N. Eldon Tanner Building, which houses the Marriott School of Management. This unique glass and granite building is a wonderfully versatile and inspiring place for students studying business and public management.

The N. Eldon Tanner Building includes a 76,000 square foot expansion dedicated in October

2008. The new four-story building expansion is attached to the west side of the current building. This expansion includes: tiered case rooms, flat classrooms, team study areas, open study areas, lockers, MBA and MPA student lounges, MBA program offices, faculty offices, conference rooms, and a New York-style deli. Part of this expansion also includes a three-level, open-air parking structure.

The Marriott School is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the Marriott School's National Advisory Council and the Executives on Campus Program.

Consisting of sixty-five to seventy prominent business and government executives, the National Advisory Council lends major support to the Marriott School. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

The Executives on Campus Program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and the Entrepreneurship Lecture Series.

**COURSE DESCRIPTION**

**M B A**

**501. Corporate Financial Reporting. (1.5)**

Analyzing financial accounting and reporting issues used by prospective managers.

**502. Managerial Accounting 1. (1.5)**

Objectives and procedures of cost accounting. Topics include job costing, joint product costing, cost behavior analysis, standard costs, cost allocation problems, and cost data use in management.

**505. Leadership. (3)**

Develop leadership ability by identifying and building upon existing strengths. Students focus on maintaining positive professional relationships while motivating high performance of individuals, teams, and organizations. Topics include organizational culture and change, leader communication, and character.

**510. Management and Information Technology. (1.5)**

Management and control with information technology. Information flow, database design, and use applied to cost controls and managerial decision making.

**520. Business Finance. (3)**

Short-term financing of a business operation. Developing techniques for financial planning, such as analysis of ratios, profitability, and liquidity.

**521. Global Treasury Management. (3)**

Prerequisite(s): M B A 520 & FIN 201

Prepare students to work as treasurer or CFO by helping them understand banking relations, cash management, short-term investing and borrowing, liquidity management, and receivables and payables management in an era of electronic commerce.

**524. Advanced Corporate Financial Reporting. (1.5)**

Areas of financial reporting where managers have considerable discretion, including pensions, leases, equity securities, earnings, dilution, employee stock options, and deferred taxes. Dynamics between auditors, managers, and financial analysts.

**527. Financial Statement Analysis. (1.5)**

Analysis of financial statements and accompanying footnotes. How various accounting methods might affect interpretation and use of financial information.

**528. Managerial Finance. (3)**

Elaboration on MBA 520 topics (i.e., capital budgetary, cost of capital, and capital structure). Concepts such as real options, valuation, and mergers introduced.

**529. Strategic Logistics Management. (3)**

Applying and integrating logistics-related topics, including materials management, physical distribution, inventory management, warehousing, logistics network design, customer service, packaging, and materials handling.

**530. Operations Management. (3)**

Examining issues and tools in production and operations management. Specific tools for forecasting, planning, inventory control, and project management presented and developed.

**532. Strategic Sourcing. (3)**

Upstream supply chain activities of supplier selection, management, and development. Topics will include negotiations, costing, product development, and commodity analysis.

**537. Change Management. (3)**

Theory and practice of change in organizations.

**542. Micro/Macro Organizational Behavior. (3)**

Foundation for understanding organizations -- behavior, structure, purposes, including models and diagnostic frameworks. How overall environment and societal context shape individuals and organizations.

**544. Team Management and Consultation. (3)**

Investigating the dynamics that make teams successful, analyzing pitfalls of working in teams, and exploring recommendations to improve team effectiveness. Identifying and resolving common team challenges, as team members and consultants to an external team.

**546. Human Resource Management Skills. (3)**

Acquiring skills and competencies including selection, compensation, performance evaluation, training evaluation, organizational assessment, and research methodology.

**547. Labor Relations and Employment Law. (3)**

U.S./International labor/ industrial relations. History, labor law, union organizing campaigns, contract negotiations, arbitration, union avoidance. Employment discrimination, work policies, and workplace safety and health.

**548. Strategic Human Resource Management. (3)**

HRM from manager's perspective. Employment relationship, recruiting/selection, employment law, performance management, and HRM in emerging companies. Managing human assets within firm's strategy, industry, and stakeholder environment.



**549R. Professional Seminar in Organizational Behavior. (0.5-3)**

Special topics or problems varying from semester to semester, e.g., conflict resolution, power and influence, intergroup relations, career development and planning, and management skills.

**549R. Work and Family. (0.5-3)**

Research and practical application related to successfully harmonizing one's family and work lives.

**549R. Understanding Organizations. (0.5-3)**

Perspectives of psychology and sociology on the organization, organizational identity, organizational effectiveness, and organizational change. Critical thinking and application to cases and personal experience.

**550. Marketing Management. (3)**

Development of analytical marketing tools and techniques; their utilization in case analysis and decision making in marketing management.

**553. Pricing Strategies. (3)**

Developing computer-based statistical analysis skills for marketing to enhance the decision-making and strategic thinking abilities of marketing managers. Topics include segmentation, targeting, positioning, and pricing.

**554. Internet Marketing. (3)**

Marketing strategy for business on the internet: marketing research, sales, and promotional concepts.

**556. Advertising and Promotion. (3)**

Key issues facing marketing managers when promoting products and services. Cases, readings, and research on the elements of effective communication strategies and promotional programs.

**580. Business Strategy. (3)**

Introduction to strategic planning; concepts, models, and analysis.

**584. Introduction to Global Management. (1.5)**

Foundations in global management integrating strategy, finance, operations, marketing, and human resource management.

**590R. Business Plan competition Management. (0.5-3)**

Directors of the BYU Business Plan Competition learn and apply skills in leadership, governance, financial management, mentoring, and VA/Angel networking. application and faculty approval required.

**590R. Miller New Venture Competition Leadership. (0.5-3)**

Working as a team with faculty and management in strategic consulting projects for local, national, and international business.

**591R. Integrative Exercise. (0.5-3)**

Integrated applications of case analysis and presentation skills. Group work to analyze cases and formulate recommendations, followed by professional presentations to groups representing management.

**593R. Management Seminar. (0.5-3)**

Invited guests speak on topics of general management interest ranging from ethics, industry problems and opportunities, and government policies to relevant current events.

**598R. Curricular Practical Training. (0.5)**

Hands-on practical training for MBA international students to be taken after their first year of the MBA program.

**602. Taxation for Decision Makers. (3)**

Analysis of business and individual transactions for their tax factors. Basic structure of the law and implications for both personal and corporate income tax.

**604. Business Ethics. (1.5)**

Basic issues, concepts, and tools of management ethics; includes ethical theory, character ethics, and social responsibility, all taught in a gospel context.

**605. Decision Analysis. (1.5)**

Applying analytical decision-making tools to management situations using spreadsheet decision models based on concepts of risk, uncertainty, and multiple criteria.

**606. Optimization. (1.5)**

Applying analytical decision-making tools to management situations, emphasizing spreadsheet decision models that optimize a key variable subject to constraints.

**609. Money, Financial Markets, and Forecasting. (3)**

Applying macroeconomics and statistics to understand key institutions, anticipate business conditions, predict interest rates, and forecast market indicators.

**614. Spreadsheet Automation and Modeling. (3)**

Prerequisite(s): Admission to a Marriott School graduate program.

Programming in Excel VBA; automating common tasks; retrieving data from web servers; building optimization models and user forms.

**615. Spreadsheets for Business Analysis. (3)**

Use of spreadsheets to support business analysis and decision making. Includes sensitivity analysis, pivot tables, introductions to databases and macros, charting, and similar topics.

**617. Risk Management. (3)**

Management of risk exposures in a business setting. Identifying, measuring, and dealing with both traditional insurable risks and financial risks.



**618.Financial Markets. (3)**

Learning how financial markets work. Understanding terminology of markets. Gaining exposure to market professionals and institutions. Developing skills in company analysis, portfolio management, and Excel spreadsheets. Preparing for careers in financial markets.

**619.Customer Relationship Management. (3)**

Methods and principles for effective management of customer relationships and interactions. Analyzing customer-interactive processes. Facilitating customer roles in the supply chain pertaining to cost, quality, and workflow. Using customer service technology for strategic advantage.

**620.Personal Financial Planning. (3)**

Financial decision making for households: income tax, retirement and estate planning, investment strategy, portfolio management, and personal risk management. Business interests affecting personal finances.

**621.Advanced Corporate Finance. (3)**

Issues such as mergers/acquisitions, valuation, financial restructurings, leveraged buyouts, capital structure, international portfolio analysis, tax-driven decisions, leasing, recapitalizations, and industry restructurings.

**622.Investments. (3)**

Basic principles and techniques of investment analysis and portfolio selection and management. Portfolio policies available to investors.

**623.Corporate Governance. (3)**

How corporate boards are led, focusing especially on the role of the director, the rights of shareholders, the compensation of executives, and the challenge boards face in balancing the needs of shareholders, managers, and other stakeholders.

**624.Capital and Security Markets. (3)**

Functions and instruments of capital markets: relationships to money markets, historical background, structures, and analysis of significant economic problems and trends in the markets.

**625.Talent Management. (3)**

Learn principles, practical methods, and best company practices to attract, develop, and retain an organization's most important resource--its talented people.

**626.Derivatives and Fixed Income. (3)**

Valuing and using derivative and fixed-income securities. Key concepts include equilibrium pricing, arbitrary pricing, and financial engineering.

**627.International Finance. (3)**

Impact that currency, tax and capital market variations between countries have on sourcing of funds, management of working capital, investment of funds, and protection of assets. Understanding the foreign exchange market.

**629A.Silver Fund, Part 1. (3)**

Prerequisite(s): Finance faculty consent.

Team management of actual investment portfolios. Responsibility for economic forecasts, security selection, and portfolio strategy. Students should register for both fall and winter semesters.

**629B.Silver Fund, Part 2. (3)**

Prerequisite(s): M B A 629A; Finance faculty consent.

Team management of actual investment portfolios. Responsibility for economic forecasts, security selection, and portfolio strategy. Students should register for both fall and winter semesters.

**631.Power, Influence, and Negotiation. (3)**

Analysis of power and influence processes; develop observational skill; roles of networks, social capital, and influence in organizations; employing power and influence to negotiate effectively.

**633.Global Supply Chain Strategy. (3)**

How companies win fiercely competitive battles for customer loyalty by bringing together the complementary competencies residing up and down the supply chain to create unique value in a rapidly changing global environment.

**634.Quality Management. (3)**

Concepts of quality management; strategic issues, philosophies, and tools used to implement and control quality.

**635.Financial Modeling A: Valuation (1.5)**

Prerequisite(s): MBA 501 & MBA 520, or Acc 440 & Fin 410.

Use spreadsheets to value businesses and structure deals; master Excel, retrieve and interpret financial data; build discounted cash flow, market comparable, and precedent transaction valuation models.

**636.Financial Modeling B: Transactions. (1.5)**

Prerequisite(s): M B A 635

Use spreadsheets to structure financial deals including mergers and acquisitions, leverage buyouts, private equity, and venture capital deals.

**638.Strategic Issues in Operations.** (3)

Interface of strategy and manufacturing. Topics include: capacity and facilities management, work force management, quality management, technology management, vertical integration, manufacturing infrastructure, manufacturing interface with other functions, and incorporating manufacturing in corporate strategy.

**639.Product Development: Market to Concept.** (3)

Prerequisite(s): Graduate standing as a student in business administration, mechanical engineering, or manufacturing, or instructor's consent.

Strategies, processes, tools, and methods in product development, focusing on initial stages of market and competitive assessment to concept development.

**640.Leadership 2: Strategies for Leading and Managing Organizations.** (1.5)

Understanding and building individual leadership skills required for a global business environment.

**645.International Human Resources.** (3)

Understanding national, organizational, and ethnic cultures and cultural frameworks used for business. Cross-country analysis; international human resource issues and working abroad.

**650.Research Methods in Marketing.** (3)

Integrating problem formation, research design, questionnaire construction, sampling, data collection, and data analysis to yield decision-making information. Examining the proper use of statistical applications and qualitative methods emphasizing results interpretation.

**651.Marketing Field Study.** (3)

Completing and analyzing a marketing project in cooperation with corporate clients. Responsibilities include problem definition, project management, report development, and presentations.

**653.Introduction to Marketing Analytics.** (3)

Types of data and analytical techniques currently used in marketing. Students will be required to analyze a variety of datasets using software tools including Tableau, R, and Sawtooth Software.

**654.Strategic Account Management.** (3)

Improvement of persuasion, selling, and interpersonal leadership skills to influence the behavior of people toward common goals. Managing salespeople and buyers to build a long-term portfolio of loyal, strategic customers.

**655.Consumer Behavior.** (3)

Improving managerial decisions by gaining an in-depth understanding of consumers. Topics include transproduct consumer needs, perception, information processing, persuasion, decision-making, and post-consumption evaluation.

**657.Brand Management Strategy.** (3)

Develop the fundamental skills required to successfully manage consumer brands, including brand strategy and development, P&L management, portfolio creation, AC Nielsen analysis, product innovation and competitive strategy.

**658.International Marketing.** (3)

Institutions and techniques related to marketing goods and services in other countries: international dimensions of product, price, distribution channels, and promotion as they are adjusted to meet social, cultural, and political environments found in other countries.

**659.Business-to-Business Marketing.** (3)

Examining the scope and challenges of business-to-business markets, including building and managing customer relationships and services, customer selection, B2B distribution channels, managing R&D and technical product development, new-product launch, positioning, and pricing.

**660.Advanced Brand Strategy.** (3)

Strategic market analysis and development and implementation of a strategic marketing plan for a new product, new business, or an ongoing operation.

**661.Global Business Negotiations.** (3)

Concepts/practices of effective negotiation in the global marketplace. Experiential learning techniques: case studies, role plays, simulations, and videos to develop skills. Cross-cultural international factors that affect negotiation.

**664.Venture Capital/Private Equity Fundamentals.** (3)

Academic and applied experience opportunities focusing on venture capital and private equity industries, capital acquisition, due diligence, management, governance issues, and best-practice decision making.

**665A.Advanced Venture Capital/Private Equity Strategies, Part 1.** (3)

Applied experience in venture capital and private equity, conducting due diligence on clients, industry, competition; observing and participating in deal structure; tracking progress of funded client companies.

**665B.Advanced Venture Capital/Private Equity Strategies, Part 2.** (3)

Applied experience in venture capital and private equity, conducting due diligence on clients, industry, competition; observing and participating in deal structure; tracking progress of funded client companies.

**669.Entrepreneurial Strategy. (3)**

Developing and applying strategies in emerging businesses, focusing on strategic business models, capital acquisition, and competitive differentiation in new businesses, especially e-businesses. Students consult directly with businesses.

**670.Innovation and Entrepreneurship. (3)**

Creating and capturing value through individual and organizational innovation; strategies to increase the flow of innovation and the probability of success.

**671.Creating New Ventures. (3)**

Prerequisite(s): M B A core.

Learning the critical skills to create a successful new venture by validating an initial idea and business model in the field.

**672.Entrepreneurial Marketing. (3)**

Strategies for start-up companies. Topics include marketing to investors, internal marketing, and marketing products/services without a marketing budget.

**674.Managing New Ventures. (3)**

Prerequisite(s): M B A core.

Drawing heavily upon the post-undergraduate professional experience, students will operate and grow high-tech or growth businesses after creating a new venture and securing funding.

**676.New Venture Launchpad. (3)**

Launching actual new ventures. Mentored learning of idea validation, business models, minimum viable products, and financing plans. Good preparation for participating in BYU's entrepreneurial competitions.

**680.Competitive Strategy. (1.5)**

Prerequisite(s): M B A 580

Advanced course in competitive strategy for dynamic markets. Exploring topics such as growth, competitor analysis, positioning, and real options. Employing frameworks such as rugged landscapes, Schumpeterian competition, and evolutionary economics to develop strategic options.

**681.Strategy Implementation. (1.5)**

Creating alignment among organizational elements of the firm; managing strategic change; and the role of personal and business values in strategy.

**683.Creative Strategic Thinking. (3)**

Understanding conditions under which creative ideas/strategies emerge; building skills for creative strategic thinking; generating valuable ideas for companies.

**685.Strategic Decision Making. (1.5)**

Economic, philosophic (logical), psychological, political, and history-based models of decision making and judgment; improving students' decision making processes.

**686.Real Estate Analysis: Finance and Investment. (3)**

Applying principles and techniques of property investments, including determining value, financing arrangements, and marketing and management problems.

**687.Strategic Simulation. (1.5)**

Participating as teams in an on-line strategy experience and practicing skills in strategy formulation, group decision making, and strategy execution

**688.Corporate Social Innovation. (1.5)**

Examining and applying models of social innovation unique to corporations: direct investment, partnerships with governments and/or NGOs, direct- or foundation-based philanthropy, and industry-or sector-level interventions, in both domestic and international contexts.

**690R.Management Field Study. (1-3)**

Experiment working with faculty and management in assisting businesses with specific projects.

**691.Real Estate Development. (3)**

Applying financial and real estate principles to practical property investments. Insights into the real estate profession, emphasizing development.

**692.Social Innovation and Social Entrepreneurship. (1.5)**

Issues facing social innovators, those that work full-time for them, and those who support them; understanding complex systems of for-profit, nonprofit, and hybrid social ventures; outlining involvement in social innovation as part of a lifetime of meaningful service.

**693R.Readings and Conference. (0.5-3)**

Subject to be arranged with instructor.

## CHEMICAL ENGINEERING

**Chair:** Lewis, Randy S.

**Graduate Coordinator:** Pitt, William G.

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(801) 422-2586

<http://chemicalengineering.byu.edu>

### THE PROGRAMS OF STUDY

The Department of Chemical Engineering at BYU has been offering graduate degrees since 1960 and has become a center of cutting-edge research and teaching. External funding for departmental research is over \$2 million per year, with 14 faculty members and approximately 40 graduate students working to solve technical, scientific, and engineering problems to meet global and societal needs. Faculty and students share their innovations and research in leading scientific publications, attend international research conferences, and collaborate with other researchers across the world. As discussed below, the department is home to a number of specialized research centers where multiple faculty members and students collaborate on long-term projects with lasting impact. The department is known for strong research programs in sustainable energy, catalysis, thermodynamics, molecular modeling, process control, electrochemical engineering, and bioengineering.

The Department of Chemical Engineering offers two degrees: Chemical Engineering-MS and Chemical Engineering-PhD. The department also offers an integrated master's program. The typical length of study for students who begin with a BS degree in chemical engineering is two years for the MS degree and four and a half years for the PhD degree.

### Chemical Engineering - PhD

A PhD in chemical engineering indicates that the graduate is

capable of and qualified to conduct independent and original research in the chemical industries and other related fields. Employees with PhD degrees are in high demand by industry, with starting salaries that are considerably higher than for BS or MS graduates. Also, a PhD degree is generally required to pursue an academic career. The doctoral program is designed to prepare the student for a lifetime of intellectual inquiry and research and is therefore more rigorous and demanding than the MS program. Students who are dedicated, diligent, and thoughtful and who can work independently are most suited for a PhD in chemical engineering at BYU.

#### Requirements for Degree.

- Credit hours: minimum 54 semester hours, at least 36 of which must be course work beyond the baccalaureate degree, plus 18 hours of dissertation (Ch En 799R). All courses taken to satisfy degree requirements must be approved by the student's advisory committee. *Candidates without a master's degree:* 36 hours. There must be at least 6 hours of the 36 in advanced mathematics, statistics, or computer science and a minimum 18 hours of dissertation (Ch En 799R). At least 3 hours of the 36 must be in 600- or 700-level lecture courses beyond the required Ch En 601 course. *Candidates with a master's degree:* with committee approval, up to 20 hours of previous graduate work, may apply toward the doctorate, but at least 36 hours must be taken at BYU (including 18 dissertation hours). Courses taken in the master's program may apply toward the required 6 hours of advanced mathematics, statistics, or computer science.
- Required courses: Ch En 531, 533, 535, 601, 791R (every semester), 6 hours of advanced mathematics, statistics, or computer science (or engineering courses that cover equivalent content), and 17 hours of elective courses.

- Foundation areas: a 3-hour course in each of the following three areas must be completed if this has not been done previously while a BS or MS student: partial differential equations, numerical analysis, and statistics. Graduate-level courses taken to fulfill this requirement also count as part of the above 36-hour overall requirement and 6-hour math-related requirement.
- Undergraduate hours: up to 6 hours of 300- and 400-level interdisciplinary courses from an approved list may be applied toward the 36 hours of course work for interdisciplinary research areas, such as biomedical engineering and statistical mechanics. These approved courses appear in the Chemical Engineering Graduate Handbook.
- Non-Ch En background: students without a previous chemical engineering degree are required to complete the following undergraduate courses in addition to the above requirements: Ch En 273, 373, 374, 376, 386; Math 302, 303; Chem 351. In addition, students without adequate exposure to the topics in Ch En 451, 476, and 477 are required to complete 2 hours of Ch En 493R during Spring Term to address these topics. Specific classes in this list may be waived by the department based on the student's prior coursework. This requirement is based on two principles: (1) Each student should have a sufficient foundational preparation in the chemical engineering discipline prior to taking the graduate core classes (Ch En 531, 533 and 535), and (2) each graduating student should be competent in a basic set of undergraduate chemical engineering skills as part of their preparation for professional practice.



- English proficiency: international students whose English language skills are judged by the department to be inadequate for completion of the degree may be required to take one or two ESL courses as specified in the admission letter.
- Residency requirement: residency is required for the major part of the work toward the doctoral dissertation. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any doctoral dissertation must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.
- Prospectus: each student must write, defend orally, and obtain approval for a prospectus on his or her proposed dissertation topic.
- Periodic reviews: The department evaluates each student's progress twice a year. Continuance as a candidate requires satisfactory ratings in these reviews.
- Examinations: a comprehensive qualifying examination on graduate engineering skills must be taken and passed at a high level as described in the Chemical Engineering Graduate Student Handbook. The examination is offered once a year.

- Dissertation: a written dissertation on a significant scientific or engineering problem must be completed and defended orally to the satisfaction of the department.
- Cumulative GPA: 3.0 or above in all PhD degree classes.

### ***Chemical Engineering - MS***

An MS in chemical engineering prepares the student for a wide variety of employment experiences in industry ranging from plant operation to plant design. Employment opportunities in research may also be available to qualified MS graduates. Typically starting salaries are slightly higher than those for BS graduates. The MS degree is designed to give the student a solid foundation in chemical engineering principles and a strong research experience. For students desiring design experience rather than research experience, the MS degree with design emphasis is available. See the Chemical Engineering Graduate Student Handbook for details: [chemicalengineering.byu.edu/Grad\\_Handbook\\_2012.pdf](http://chemicalengineering.byu.edu/Grad_Handbook_2012.pdf).

#### **Requirements for Degree.**

- Credit hours: minimum 30 hours including 6 thesis hours (Ch En 699R). No more than 9 hours of 300-499 level course work will apply toward the master's degree. All courses taken to satisfy degree requirements must be approved by the student's advisory committee.
- Required courses: Ch En 531, 533, 535, 601, 691R (every semester) and electives (12 or more hours). For requirements of special programs, see the Chemical Engineering Graduate Student Handbook (see web address above).
- Non-Ch En background: students without a previous chemical engineering degree are required

to complete the following undergraduate courses in addition to the above requirements: Ch En 273, 373, 374, 376, 386; Math 302, 303; Chem 351. In addition, students without adequate exposure to the topics in Ch En 451, 476, and 477 are required to complete 2 hours of Ch En 493R during Spring Term to address these topics. Specific classes in this list may be waived by the department based on the student's prior coursework. This requirement is based on two principles: (1) each student should have a sufficient foundational preparation in the chemical engineering discipline prior to taking the graduate core classes (Ch En 531, 533, and 535), and (2) each graduating student should be competent in a basic set of undergraduate chemical engineering skills as part of their preparation for professional practice.

- English proficiency: international students whose English language skills are judged by the department to be inadequate for completion of the degree may be required to take one or two ESL courses as specified in the admission letter.
- Residency requirement: residency is required for the major part of the work toward the master of science thesis. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU (at least two consecutive full-time semesters). In residence? is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work applying toward any master's project or thesis must be completely open for university



review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.

- Prospectus: each student must submit and obtain approval for a written prospectus on his or her proposed thesis topic.
- Periodic reviews: The department evaluates each student's progress twice a year. Continuance as a candidate requires satisfactory ratings in these reviews.
- Examinations: a comprehensive qualifying examination on graduate engineering skills must be taken and passed as described in the Chemical Engineering Graduate Student Handbook. The examination is offered once a year.
- Thesis: a written thesis on a significant engineering problem must be completed and defended orally to the satisfaction of the department.
- Cumulative GPA: 3.0 or above in all MS degree classes.

## FINANCIAL ASSISTANCE

For all graduate degree programs, support is available from the department and the university in the form of teaching assistantships and competitive fellowships, and from faculty members in the form of research assistantships. Nearly every graduate student receives financial support.

## RESOURCES AND OPPORTUNITIES

All the faculty members actively participate in research endeavors, and a number have gained international recognition for their work.

Some of the major facilities in the Department of Chemical Engineering are:

### The Advanced Combustion Engineering Research Center (ACERC)

is internationally recognized as a leading center for interdisciplinary energy research. Initially founded by the National Science Foundation (NSF) as an engineering research center, ACERC now represents a collaborative effort of faculty with similar research interests and funding from both industrial and government sources. Students and faculty associated with the center pursue experimentation, analysis, computer modeling, and design of combustion systems.

### DIPPR Thermophysical Properties Laboratory

Development and management of the DIPPR 801 thermophysical property database is the major pursuit of the DIPPR laboratory. This database, perhaps the best in the world of its kind, is sponsored by the Design Institute for Physical Property Data (DIPPR) of the American Institute of Chemical Engineers (AIChE). Research activities consist of collecting and evaluating literature data on pure component properties and developing correlation and prediction techniques. Experimental projects also compose a significant emphasis of the laboratory.

**Catalysis Laboratory.** The lab has a thirty-two-year history of productive research in heterogeneous catalysis. Highly interdisciplinary in nature, this research applies principles of kinetics, chemistry, materials science, surface science, and chemical engineering to the understanding of catalyst properties and catalytic reactions.

## COURSE DESCRIPTION

### CH EN

#### 513.Molecular Modeling. (3)

Prerequisite(s): CH EN 373; or CHEM 463; or concurrent enrollment.

Fundamentals of quantum mechanics, statistical mechanics, and molecular-level modeling. Basics of computational chemistry and simulations using deterministic and stochastic methods (molecular dynamics and Monte Carlo) to calculate thermodynamic and transport properties of fluids and fluid mixtures.

#### 518.Biomedical Engineering Principles. (3)

Prerequisite(s): CH EN 374 & CH EN 376; or equivalent.

Application of chemical engineering principles to model physiologic systems and to solve medical problems.

#### 519.Biochemical Engineering. (3)

Prerequisite(s): CH EN 374 & CH EN 386; or concurrent enrollment.

Applying chemical engineering principles to biochemical systems.

#### 528.Industrial Catalytic Processes. (2)

Prerequisite(s): CH EN 386

Fundamentals of catalytic chemistry and materials; applications to important industrial catalytic processes. Includes catalyst materials and preparation, catalyst characterization, fixed-bed reactor design, and catalyst deactivation.

#### 531.Thermodynamics of Multicomponent Systems. (3)

Prerequisite(s): CH EN 373; or CHEM 463; or concurrent enrollment.

Fundamental concepts and applications in first and second laws, equilibrium and stability, phase equilibrium, and homogeneous and heterogeneous chemical equilibrium.

## CHEMICAL ENGINEERING

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### **533.Transport Phenomena. (3)**

Prerequisite(s): CH EN 376 & MATH 303; or CH EN 376 & MATH 447; ChEn 476 or concurrent enrollment.

Transport mechanisms and coefficients and fundamental field equations for momentum, heat, and mass transport, with application to system design.

### **535.Kinetics and Catalysis. (3)**

Prerequisite(s): CH EN 386

Theories and principles of chemical kinetics, including heterogeneous catalysis and reactor design.

### **541.Computer Design Methods. (3)**

Prerequisite(s): CH EN 376 & MATH 303; or CH EN 376 & MATH 334; or equivalent.

Computer-aided design and numerical methods of chemical engineering processes.

### **578.Polymer Science and Engineering. (3)**

Prerequisite(s): CH EN 378; or equivalent.

Foundation science and theory of polymer chemistry and physics and their implications in engineering applications. Topics include polymerization chemistry, structure-property relationships, polymer physics, and transport properties.

### **593R.Special Topics - Intermediate. (1-3)**

Prerequisite(s): Instructor's consent.

Special topics for advanced undergraduate students and for graduate students.

### **601.Directed Graduate Studies. (2)**

Prerequisite(s): CH EN 531 & CH EN 533 & CH EN 535

Guided preparation for department's comprehensive exams and for formulation of research prospectus.

### **610.Principles of Reservoir Engineering. (3)**

Prerequisite(s): Ch En 373 or equivalent.

Reservoir and hydrocarbon classification; fluid flow; primary oil and gas recovery mechanisms; enhanced oil recovery.

### **633.Combustion Processes. (3)**

Prerequisite(s): ChEn 533 or equivalent.

Fundamentals of transport processes in reacting flow systems with specific applications of various combustion processes.

### **641.Combustion Modeling. (3)**

Prerequisite(s): CH EN 633 & MATH 410; or CH EN 633 & CH EN 541

Theory of combustion systems and quantitative procedures for computing performance of combustion chambers. Applications include turbulent combustion of gases, sprays, and particulates.

### **674.Advanced Thermodynamics. (2)**

Prerequisite(s): ChEn 531 or equivalent.

Advanced topics of thermodynamics, including electrolytes, phase equilibrium modeling, nonequilibrium thermodynamics, and calorimetry.

### **691R.Seminar for Master's Students. (0.5)**

Technical presentations by graduate students, faculty members, and guests.

### **693R.Special Topics--Graduates. (0.5-6)**

### **698R.Master's Project. (0.5-6)**

### **699R.Master's Thesis. (0.5-9)**

### **733.Coal Combustion. (3)**

Prerequisite(s): Instructor's consent.

Fundamentals of coal combustion and gasification processes, including particle mechanics, devolatilization, heterogeneous oxidation, radiative heat transfer, and combustion of coal in practical flames.

### **791R.Seminar for Doctoral Students. (0.5)**

### **793R.Selected Topics in Chemical Engineering. (0.5-3)**

Topics vary according to student-faculty interests.

### **799R.Doctoral Dissertation. (0.5-9)**

## **FACULTY**

**Argyle, Morris D.** *Associate Professor*, PhD, University of California, Berkeley, 2003. Catalysis

**Baxter, Larry L.** *Professor*, PhD, Brigham Young University, 1989. Sustainable Energy

**Bundy, Bradley C.** *Assistant Professor*, PhD, Stanford University, 2009. Bioengineering

**Cook, Alonzo D.** *Associate Professor*, PhD, Massachusetts Institute of Technology, 1996. Tissue Engineering

**Fletcher, Thomas H.** *Professor*, PhD, Brigham Young University, 1983. Coal Combustion; Gasification; Gas Turbine Combustion

**Harb, John N.** *Professor*, PhD, University of Illinois, 1988. Electrochemical Engineering

**Hecker, William C.** *Associate Professor*, PhD, University of California, Berkeley, 1982. Catalysis; Chemical Kinetics

**Hedengren, John D.** *Assistant Professor*, PhD, University of Texas, Austin, 2005. Process Control and Optimization

**Knotts, Thomas A.** *Associate Professor*, PhD, University of Wisconsin, Madison, 2006. Molecular Modeling

**Lewis, Randy S.** *Professor*, PhD, Massachusetts Institute of Technology, 1995. Bioengineering

**Lignell, David O.** *Assistant Professor*, PhD, University of Utah, 2008. Reacting Flow Simulation

**Pitt, William G.** *Professor*, PhD, University of Wisconsin, Madison, 1987. Ultrasonic Delivery of Pharmaceuticals; Biomedical Polymers

**Wheeler, Dean R.** *Associate Professor*, PhD, University of California, Berkeley, 2002. Electrochemical Engineering; Molecular Modeling

**Wilding, W. Vincent** *Professor*, PhD, Rice University, 1985. Applied Thermodynamics

## CHEMISTRY AND BIOCHEMISTRY

**Chair:** Burton, Gregory F.

**Graduate Coordinator:** Farnsworth, Paul B.

C-100 BNSN, Provo, UT 84602-5700  
(801) 422-4845  
[chemgradcat@byu.edu](mailto:chemgradcat@byu.edu)  
<http://www.chem.byu.edu>

### THE PROGRAMS OF STUDY

Chemistry and biochemistry are fundamental to our understanding of the physical and biological world. The principles and applications of chemistry and biochemistry are diverse, interesting, and challenging. The graduate programs in the Department of Chemistry and Biochemistry are designed to develop well-educated scientists who can contribute in diverse circumstances where chemical/biochemical knowledge and skills are needed.

Approximately thirty faculty are the foundation of our excellent graduate program. The department occupies the 190,000-square-foot Benson Science Building, which provides comfortable, modern laboratories. Extensive instrumentation is available and constantly being replaced or upgraded to support cutting-edge research.

Approximately 100 graduate students provide an essential and dynamic atmosphere for research progress and stimulating discussion. Our postdoctoral students and visiting scientists add depth and diversity to the intellectual atmosphere. Moreover, a strong population of undergraduate research assistants also brings significant strength and enthusiasm to research projects.

Additional information about faculty members and their research interests is available on the department website: <http://www.chem.byu.edu/>

The Department of Chemistry and Biochemistry offers four degrees: Chemistry-MS, Biochemistry-MS, Chemistry-PhD, and Biochemistry-PhD.

Areas of emphasis include: Analytical Chemistry, Biochemistry, (Molecular Biology), Inorganic/Materials Chemistry, Organic and Biomolecular Chemistry, and Physical Chemistry.

The majority of our graduate students are in the PhD program, and they complete their work in approximately five years. MS program students complete their work in about two and a half years.

### Chemistry - PhD

The chemistry PhD degree prepares a scientist to contribute on the creative front of chemical science. The PhD student will select one of the four chemistry areas of emphasis, but there is sufficient flexibility in course and committee selection that a program of study can acquire a significant interdisciplinary character. Some courses on advanced topics related to the student's professional goals will be taken, but the PhD degree is primarily a research experience that is to be reported in a dissertation and in the scientific literature. The PhD chemist is prepared for a wide range of career choices and will be expected to act with considerable independence and enjoy major responsibilities. A new PhD chemist may seek employment in industry, government agencies, or the university or college setting.

### Requirements for Degree.

- Credit hours (54): 36 hours of course work and research plus 18 dissertation hours (Chem 699R). (With departmental approval, some credit from an MS degree may be applied toward this requirement.)
- Required courses: Chem 594R (every semester in residence), 601, 694 and other courses as required by the area of emphasis and as specified by committee.

## CHEMISTRY AND BIOCHEMISTRY

- Semi-annual progress review and/or examination.
- Comprehensive qualifying exam: written and/or oral.
- Dissertation.
- Final oral examination consisting of two parts: (A) public presentation of original research described in dissertation; (B) comprehensive examination on course work, research and dissertation.

### **Chemistry - MS**

The chemistry MS degree provides specialized study and research on an advanced level. It includes about one year of course work beyond the bachelor's degree and the development of a significant research project presented in a thesis. The MS student will select one of the four chemistry areas of emphasis, but there is sufficient flexibility in course and committee selection that a program of study can acquire a significant interdisciplinary character. The added preparation in theory and practice allows the chemical scientist to assume responsibility and supervision beyond that normally given with bachelor's level study. The MS degree is adequate preparation for some junior college teaching positions. The master's degree is generally not necessary as a preparatory step for the PhD degree.

#### **Requirements for Degree.**

- Credit hours (30): 24 hours of course work and research plus 6 thesis hours (Chem 699R).
- Required courses: Chem 594R (every semester in residence), 601, 694, and other courses as required by the area of emphasis and as specified by committee.
- Semi-annual progress review and/or examination.
- Thesis.

- Final oral examination consisting of two parts: (A) public presentation of original research described in thesis; (B) comprehensive examination on course work, research, and thesis.

### **Biochemistry - PhD**

The biochemistry PhD degree prepares a scientist to perform and to supervise creative research in biochemistry and molecular biology. The PhD degree requires some course work, but the emphasis is primarily on original, creative research leading to a dissertation and to publications in scientific journals. The PhD biochemist is prepared for a wide range of career opportunities that involve independent thinking and supervisory responsibilities in industry, government, or academia.

#### **Requirements for Degree.**

- Credit hours (54): 36 hours of course work and research plus 18 dissertation hours (Chem 699R). (With departmental approval, some credit from an MS degree may be applied toward this requirement.)
- Required courses: Chem 581, 583, 584, 586, 594R (every semester in residence), 601, 689R, 694, and other courses as specified by committee.
- Semi-annual progress review, examinations, and presentations.
- Dissertation.
- Final oral examination consisting of two parts: (A) public presentation of original research described in dissertation; (B) comprehensive examination on course work, research and dissertation.

### **Biochemistry - MS**

The Biochemistry MS degree provides specialized study on an advanced level. The degree includes about one year of course work

beyond the BS degree and a thesis based upon a significant research project. The research will be in areas of biochemical emphasis, such as molecular biology, RNA evolution, signal transduction, or protein structure and function. The added preparation in theory and practice allows the MS biochemist to assume responsibility and supervision beyond that normally given a BS or BA biochemist. The MS degree is adequate preparation for some junior college teaching positions. It is generally not a prerequisite for a PhD degree program.

#### **Requirements for Degree.**

- Credit hours (30): 24 hours of course work and research plus 6 thesis hours (Chem 699R).
- Required courses: Chem 581, 583, 584, 586, 594R (every semester in residence), 601, 694, and other courses as specified by committee.
- Semi-annual progress review and/or examination.
- Thesis.
- Final oral examination consisting of two parts: (A) public presentation of original research described in thesis; (B) comprehensive examination on course work, research, and thesis.

### **FINANCIAL ASSISTANCE**

All eligible students in the department's graduate programs who request financial aid are granted tuition for all required graduate courses and a graduate assistantship. These awards are granted on a continuing basis as long as satisfactory progress is being made toward the degree. This financial assistance allows students to be involved full-time in their graduate program, which includes research and course work and may also include teaching and research assistant assignments.



Some highly qualified applicants are offered additional funding through the HIDRA, college fellowships, or Nichols Maw awards. Other types of financial aid such as internships, scholarships, and student loans may also be available to students who qualify. More information may be obtained from the department office and from the Financial Aid Office.

The department relies on its graduate students to fill many assignments in laboratory and recitation instruction. Unless excused by the faculty, a graduate student would typically be a teaching assistant for at least two semesters for twenty hours a week during residency toward the degree.

## RESOURCES AND OPPORTUNITIES

**Cancer Research Center.** The objective of the BYU Cancer Research Center is to make significant scientific contributions toward the control and cure of cancer. Intense investigations of oncogenes and their relation to the development of cancer represents a major activity within the center. Faculty and students from the Department of Chemistry and Biochemistry and from the College of Life Sciences contribute their expertise.

Detailed information about the department, our facilities, and programs is available on the department's web site at [www.chem.byu.edu](http://www.chem.byu.edu), *The cancer research center's site is at <https://cancerresearch.byu.edu/>*. We encourage you to explore these sites and to contact the department office for answers to any questions that you may have (see the address information below).

## COURSE DESCRIPTION

### CHEM

#### 500.(Chem-C S-Geol-Math-MthEd-Phscs-Stat) Business Career Essentials in Science and Math. (1.5)

Introduction for science, math, and statistics majors to careers in industry. Project planning, oral and written business presentations, business accounting, and technology readiness.

#### 514.Inorganic Chemistry. (3)

Prerequisite(s): CHEM 462; or CHEM 468

In-depth treatment of theoretical concepts in inorganic chemistry and solid state, organometallic, and bioinorganic chemistry.

#### 518.Advanced Inorganic Laboratory. (2)

Prerequisite(s): CHEM 514; Chem 201 or 601 or concurrent enrollment.

Synthesis, characterization, and properties of materials; coordination and organometallic compounds.

#### 521.Instrumental Analysis Lecture. (2)

Prerequisite(s): CHEM 462 & PHSCS 220; or CHEM 467 & PHSCS 220; or CHEM 468 & PHSCS 220

Modern instrumental methods and basic principles of instrumentation.

#### 523.Instrumental Analysis Laboratory. (2)

Prerequisite(s): CHEM 521; Chem 201 or 601 or concurrent enrollment.

Continuation of Chem 521. Laboratory experience with modern analytical instrumentation.

#### 552.Advanced Organic Chemistry. (3)

Prerequisite(s): CHEM 352M; or CHEM 352; Chem 462 and 463 (or Chem 468).

Physical aspects of organic chemistry; mechanisms, reaction intermediates, bonding, stereochemical and stereoelectronic effects, molecular orbital theory, Lewis acidity and basicity.

#### 553.Advanced Organic Chemistry. (3)

Prerequisite(s): CHEM 352; or CHEM 352M

Synthetic aspects of organic chemistry; oxidations, reductions, concerted reactions, stereoselectivity, synthetic equivalents, protecting groups. Examples of natural product total synthesis.

#### 555.Organic Spectroscopic Identification. (3)

Prerequisite(s): CHEM 352M; or CHEM 352

Theory and practice of spectrometric methods of identifying organic compounds, including infrared, ultraviolet nuclear magnetic resonance, and mass spectrometries.

#### 561.Chemical Thermodynamics. (3)

Prerequisite(s): CHEM 462 & CHEM 463

Development of the principles of chemical thermodynamics, including laws, pure materials, mixtures, equilibria, and elementary statistical mechanics.

#### 563.Reaction Kinetics. (3)

Prerequisite(s): CHEM 462 & CHEM 463

Theoretical aspects of chemical kinetics in the gas phase and in solution. Rates and mechanisms in solution, rapid reactions, and other topics.



## CHEMISTRY AND BIOCHEMISTRY

### 565.Introduction to Quantum Chemistry. (3)

Prerequisite(s): CHEM 462 & CHEM 463

Introduction to physical and mathematical aspects of quantum theory, emphasizing application of the Schrodinger wave equation to chemical systems.

### 567.Statistical Mechanics. (3)

Prerequisite(s): CHEM 462 & CHEM 463

Introduction to classical and quantum statistical mechanics, including Boltzmann, Fermi-Dirac, and Bose-Einstein statistics. Applications of statistical thermodynamics to gases, liquids, and solids.

### 569.Fundamentals of Spectroscopy. (3)

Prerequisite(s): CHEM 462; or CHEM 468

Atomic and molecular spectroscopy and application of group theoretical concepts. Types of experiments and interpretation of data.

### 581.Advanced Biochemical Methodology 1. (3)

Prerequisite(s): CHEM 482

Analytical and structural determination methods used in biochemical research, including mass spectrometry-based proteomics, immunotechniques, atomic force and electron microscopy, NMR and X-ray diffraction.

### 583.Advanced Biochemical Methodology 2. (3)

Prerequisite(s): CHEM 482

Maintenance and expression of genetic information, the role of nucleic acids in biology at the chemical and structural level, and methods to study and control nucleic acid function as a means of solving biological problems.

### 584.Biochemistry Laboratory/ Proteins. (3)

Prerequisite(s): CHEM 481M; or CHEM 481

Introduction to current biochemical research procedures including spectrophotometry, chromatography, electrophoresis, and immunological techniques. Protein over-expression; isolation and characterization methods. Enzyme kinetics and protein-ligand interactions. Introduction to bioinformatics.

### 586.Biochemistry Laboratory/ Nucleic Acids. (3)

Prerequisite(s): CHEM 482

Laboratory course covering major techniques involved in isolation, amplification, and cloning of recombinant DNA as well as isolation, synthesis, translation, and identification of RNA.

### 594R.General Seminar. (0.5)

Research topics presented by faculty and visiting scientists.

### 596R.Special Topics in Chemistry. (0.5-3)

### 596R.Atmospheric Chemistry. (0.5-3)

### 601.Safe Chemical Practices. (0.5)

University and department safety policies. Chemical hazards, fire safety, and biosafety, including laws.

### 619R.Chemistry of the Transition Elements. (0.5-3)

### 629R.Separation Method of Analysis. (0.5-3)

Prerequisite(s): Chem 521 or equivalent.

### 629R.Spectroscopic Methods of Analysis. (0.5-3)

Prerequisite(s): Chem 521 or equivalent.

### 629R.Mass Spectrometry. (0.5-3)

Prerequisite(s): Chem 521 or equivalent.

### 655.Advanced Techniques in Nuclear Magnetic Resonance. (1)

Prerequisite(s): Chem 455 or 555 or equivalent.

Introduction to techniques such as DEPT, COSY, HETCOR, ROESY, INADEQUATE, HMQC, HSQC, and HMBC.

### 659R.Bioorganic Chemistry. (0.5-3)

Prerequisite(s): Chem 552 or equivalent.

### 659R.Natural Products Chemistry. (0.5-3)

Prerequisite(s): Chem 552 or equivalent.

### 659R.Organometallic Chemistry. (0.5-3)

Prerequisite(s): Chem 552 or equivalent.

### 689R.Advanced Topics in Biochemistry. (0.5-3)

Prerequisite(s): Chem 583 or equivalent.

The following topics are rotated: cellular signal transduction, clinical chemistry, biochemical immunology, bioinorganic chemistry, genetic modeling of human disease, molecular biology of cancer, regulatory RNA, proteomics, and structural biochemistry.

### 689R.Cellular Signal Transduction. (0.5-3)

Prerequisite(s): Chem 583 or equivalent.

### 689R.Bioinorganic Chemistry. (0.5-3)

Prerequisite(s): Chem 583 or equivalent.

### 689R.Genetic Modeling of Human Disease. (0.5-3)

Prerequisite(s): Chem 583 or equivalent.

### 689R.Regulatory RNA. (0.5-3)

Prerequisite(s): Chem 583 or equivalent.

**689R.Proteomics.** (0.5-3)

Prerequisite(s): Chem 583 or equivalent.

**689R.Structural Biochemistry.** (0.5-3)

Prerequisite(s): Chem 583 or equivalent.

**694.Scientific Writing and Professional Ethics.** (1)

Prerequisite(s): CHEM 594R Professional standards.

Manuscript preparation and attendance at seminars by faculty and visiting scientists.

**697R.Graduate Research.** (0.5-6)

Prerequisite(s): Chem 601 or concurrent enrollment.

**699R.Graduate Thesis/Dissertation.** (0.5-9)**719R.Selected Topics in Inorganic Chemistry.** (0.5-3)

Subjects that may be offered: materials chemistry.

**719R.Materials Chemistry.** (1-3)**729R.Selected Topics in Analytical Chemistry.** (0.5-3)

Subjects that may be offered are: atomic spectroscopy, laser spectroscopy, mass spectrometry, microfabrication/nanotechnology, and surface chemistry and analysis.

**729R.Mass Spectrometry.** (0.5-3)**729R.Microfabrication/ Nanotechnology.** (0.5-3)**729R.Surface Chemistry and Analysis.** (0.5-3)**FACULTY**

**Andersen, Joshua L.** *Assistant Professor*, PhD, University of Utah, 2006. Biochemistry

**Andrus, Merritt B.** *Professor*, PhD, University of Utah, 1991. Organic Chemistry

**Asplund, Matthew C.** *Associate Professor*, PhD, University of California, Berkeley, 1998. Physical Chemistry

**Austin, Daniel E.** *Associate Professor*, PhD, California Institute of Technology, 2003. Analytical Physical Chemistry

**Burt, Scott R.** *Assistant Teaching Professor*, PhD, University of California, Berkeley, 2008. Physical Chemistry

**Burton, Gregory F.** *Professor*, PhD, Medical College of Virginia, Virginia Commonwealth, 1989. Biochemistry

**Castle, Steven L.** *Professor*, PhD, Scripps Research Institute, 2000. Organic Chemistry

**Dearden, David V.** *Professor*, PhD, California Institute of Technology, 1989. Analytical/Physical Chemistry

**Ess, Daniel H.** *Assistant Professor*, PhD, University of California, Los Angeles, 2007. Organic Chemistry

**Farnsworth, Paul B.** *Professor*, PhD, University of Wisconsin, Madison, 1981. Analytical Chemistry

**Goates, Steven R.** *Professor*, PhD, University of Michigan, 1981. Analytical Chemistry

**Graves, Steven W.** *Professor*, PhD, Yale University, 1978. Biochemistry

**Hansen, Jaron C.** *Associate Professor*, PhD, Purdue University, 2002. Analytical Chemistry

**Harrison, Roger G.** *Associate Professor*, PhD, University of Utah, 1993. Inorganic/Materials Chemistry

**Lee, Milton L.** *Professor*, PhD, Indiana University, 1975. Analytical Chemistry

**Linford, Matthew R.** *Professor*, PhD, Stanford University, 1996. Analytical/Materials Chemistry

**Macedone, Jeffrey H.** *Associate Teaching Professor*, PhD, Brigham Young University, 2004. Analytical Chemistry

**Michaelis, David J.** *Assistant Professor*, PhD, University of Wisconsin-Madison, 2009. Organic Chemistry

**Patterson, James E.** *Associate Professor*, PhD, University of Illinois at Urbana-Champaign, 2004. Physical Chemistry

**Peterson, Matt A.** *Associate Professor*, PhD, University of Arizona, 1992. Organic Chemistry

**Price, John C.** *Assistant Professor*, PhD, Pennsylvania State University, 2005. Biochemistry

**Price, Joshua L.** *Assistant Professor*, PhD, University of Wisconsin, Madison, 2008. Organic Chemistry

**Savage, Paul B.** *Professor*, PhD, University of Wisconsin, 1993. Organic Chemistry

**Sevy, Eric T.** *Associate Professor*, PhD, Columbia University, 1999. Physical Chemistry

**Simmons, Daniel L.** *Professor*, PhD, University of Wisconsin, Madison, 1986. Biochemistry

**Stowers, Kara J.** *Assistant Professor*, PhD, University of Michigan, 2012.

**Watt, Richard K.** *Associate Professor*, PhD, University of Wisconsin, Madison, 1998. Inorganic/Biochemistry

**Willardson, Barry M.** *Professor*, PhD, Purdue University, 1990. Biochemistry

## CIVIL AND ENVIRONMENTAL ENGINEERING

**Woodfield, Brian F.** *Professor, PhD,*  
University of California, Berkeley,  
1994. Physical Chemistry

**Woolley, Adam T.** *Professor, PhD,*  
University of California, Berkeley,  
1997. Analytical/Materials  
Chemistry

## CIVIL AND ENVIRONMENTAL ENGINEERING

**Chair:** Hotchkiss, Rollin H.  
**Graduate Coordinator:** Fonseca,  
Fernando S.  
**Associate Chair:** Jensen, David W.

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[civil@et.byu.edu](mailto:civil@et.byu.edu)  
<http://ceen.et.byu.edu>

### THE PROGRAMS OF STUDY

Two degrees are offered through the Department of Civil and Environmental Engineering: Civil Engineering MS and Civil Engineering PhD.

The Department of Civil and Environmental Engineering admits approximately fifty students each year into its programs.

### *Civil Engineering - MS*

The MS degree builds on the foundation of skills, breadth, and depth of the undergraduate education to achieve greater competency. The MS program brings students to the state-of-the-art in one or more specialty areas enabling them with the skills necessary to handle problems at the cutting edge of the profession.

There are two MS options: Thesis and Project

Students pursuing the thesis option gain the added dimension of participating in research work at the cutting-edge of the profession. This research work culminates in a high-quality thesis presentation. Electronic submission of the thesis is required. Students pursuing the project option complete a less intensive research or design study project but have additional class requirements.

### Requirements for Degree.

- Credit hours: **Thesis program:** 31 minimum approved hours including 6 thesis hours and 1 hour of Graduate Seminar. **Project**

**program:** 31 minimum approved hours including 3 project hours and 1 hour of Graduate Seminar.

- Program of Study: the graduate program of study must be submitted during the first semester of graduate study.
- Evaluations: evaluation of the student's graduate program progress by his/her department advisor is required at least twice each academic year.
- Residency requirements: residency is required for the major part of the work. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU. In residence? is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed.
- Prospectus: Students must submit a written prospectus on their proposed research topic during their first semester of graduate seminar.
- Examinations: students must complete an oral defense of thesis or oral presentation of project.
- Thesis or Project.
- Cumulative 3.0 GPA or above in all program of study courses.
- For a more detailed description of the graduate program requirements, see: <http://ceen.et.byu.edu> and <http://graduatestudies.byu.edu>.

### Civil Engineering - PhD

The PhD degree is awarded to candidates who have made a significant contribution to knowledge in a particular specialization of civil and environmental engineering and complete a dissertation. Electronic submission of the dissertation is required. Adequate course work is necessary to provide a foundation of expertise for quality research.

#### Requirements for Degree.

Credit hours

- Candidates with a master's degree: minimum 58 approved semester hours.

These hours include:

- At least 38 hours must be graduate-level courses (up to 20 hours of 500+ level courses can be transferred from the master's degree if approved by the graduate committee)
- A minimum 18 hours dissertation
- Candidates without a master's degree: minimum 56 approved semester hours

These hours include:

- At least 36 hours must be graduate-level courses
- A minimum 18 hours of dissertation

**NOTE:** All PhD candidates must have 2 hours of Graduate Seminar which are included in the minimum hours.

- Students with no advanced mathematics, statistics, or science in their baccalaureate degree may be required to take additional courses in these areas.
- Program of study: the graduate program of study must be submitted during the first year of doctoral study
- Evaluations: evaluation of the student's graduate program progress by his/her department advisor is required at least twice each academic year.

- Residency requirements: residency is required for the major part of the work. This work must be completed under the specific direction of a graduate faculty member while the student is in residence at BYU. "In residence" is defined as (1) being registered for credit as a graduate student and (2) living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty. Further, all work must be completely open for university review and publication. Any exceptions to the above must be supported by written approval from the department and college and obtained in advance of any work being performed. In addition, a doctoral student must register for a minimum of 6 hours in two consecutive semesters.
- Comprehensive qualifying examination: students must take and pass a written comprehensive qualifying examination based on graduate course work. After passing this examination, the student is accepted to candidacy for the doctoral degree. The examination is offered when the candidate completes two semesters of coursework and must be taken at least one year before completion of the degree.
- Prospectus: students must submit and successfully defend a written prospectus on their proposed dissertation research topic at least one year before completion of the degree.
- Dissertation.
- Oral defense of dissertation.
- For a more detailed description of the graduate program requirements, see: <http://ceen.et.byu.edu> and <http://graduatestudies.byu.edu>

### FINANCIAL ASSISTANCE

**Departmental Scholarships.** Master's or PhD candidates are eligible for

scholarships each year. Applications may be obtained in January on the department Web site; the awards are given in mid-May for the next academic year. Selection is based on need and on scholastic merit. These scholarships may be received in addition to any assistantships or privately endowed awards unless the total financial aid package exceeds the scholarship limit stipulated by the university.

**Research Assistantships.** Faculty may have funds from both off-campus and on-campus sources to support research assistants. These awards support students at the current pay rate for up to 28 hours per week depending on eligibility.

**Teaching Assistantships.** All graduate students are eligible to be TAs. The assistantships range from 10-20 hours per week and consist of teaching labs and grading courses.

### RESOURCES AND OPPORTUNITIES

For information on resources and opportunities, please visit <http://ceen.et.byu.edu>

### COURSE DESCRIPTION

#### CE EN

##### 500.(CE En-Me En) Design and Materials Applications. (3)

Prerequisite(s): ME EN 372; or CE EN 321; or equivalent.

Applied and residual stress; materials selection; static, impact, and fatigue strength; fatigue damage; surface treatments; elastic deflection and stability--all as applied to mechanical design.

##### 501.(CE En-MeEn) Stress Analysis and Design of Mechanical Structures. (3)

Prerequisite(s): CE EN 321; or ME EN 372; or equivalent.

Stress analysis and deflection of structures; general bending and torsion with computer applications to mechanical and aerospace structure design.



## 503.(CE En-Me En) Plasticity and Fracture. (3)

Prerequisite(s): CE EN 203 & ME EN 250 & MATH 303; Senior standing or instructor's consent.

Tensor algebra; stress and deformation tensors; relationships between dislocation slip, yielding, plastic constitutive behavior, and microstructure development; cracks and linear elastic fracture mechanics.

## 504.(CE En-Me En) Computer Structural Analysis and Optimization. (3)

Prerequisite(s): CE EN 321; or ME EN 372; or equivalent; linear algebra.

Matrix stiffness method for 1D, 2D, and 3D skeletal structure classes. Implementing the matrix stiffness method as a computer program. Nonlinear second-order structural analysis. Structural optimization techniques including stress-ratio method, gradient-based methods, and genetic algorithms.

## 505.Portland Cement Concrete Mixture Design and Analysis. (3)

Prerequisite(s): CE EN 306; or equivalent.

Properties and testing of freshly mixed and hardened concrete and constituent materials; concrete mixture design and analysis; concrete construction practices; laboratory experimentation.

## 507.(CE En-Me En) Linear Finite Element Methods. (3)

Prerequisite(s): CE EN 321; or ME EN 372

Linear static finite element analysis of elastic solids; problem formulation, finite element discretization, and equation solving; stability, interpolation theory, and error estimates. Introduction to underlying continuum mechanics principles. Isogeometric analysis as a generalization of classical finite element analysis; basic principles of analysis-suitable computational geometry.

## 508.(CE En-Me En) Structural Vibrations. (3)

Prerequisite(s): CE EN 321; or ME EN 372; or equivalent.

Dynamic analysis of single degree-of-freedom, discrete multi-degree-of-freedom, and continuous systems. Applications include aerospace, civil structures, and mechanical components.

## 521.Seismic-Resistant Steel Buildings. (3)

Prerequisite(s): CE EN 421; or equivalent.

Background and development of UBC seismic provisions; design of ductile braced frames and steel moment resisting frames; design of diaphragms and collectors.

## 523.(CE En-Me En) Aircraft Structures. (3)

Prerequisite(s): CE En 304 or Me En 250 or equivalent. CE En 321 or Me En 372 or equivalent.

Requirements, objectives, loads, materials, and tools for design of airframe structures; static behavior of thin-wall structures; durability and damage tolerance; certification and testing. Airframe component team design project.

## 525.Bridge Structures. (3)

Prerequisite(s): CE EN 421 & CE EN 424; or equivalent.

Design of composite, continuous beam, and girder bridges, including piers, abutments, floor systems, and bearings; field trips to observe bridge construction and fabrication.

## 528.Masonry Design. (3)

Prerequisite(s): CE EN 424; or equivalent.

Introduction to analysis, design, and construction of masonry structures. Compressive, tensile, flexural, and shear behavior of masonry structural components.

## 529.Timber Design. (3)

Prerequisite(s): CE EN 304 & CE EN 321 & CE EN 421; or equivalents.

Timber species, composition, and grades; design of beams, straight and tapered glue-lam girders, columns, connections, trusses, shear walls, and structural systems.

## 531.Principles of Hydrologic Modeling (3)

Prerequisite(s): CE EN 431; or equivalent.

Advanced hydrologic and hydraulic principles with an emphasis on modeling for the purpose of planning and designing draining, flood control, and other water resource facilities.

## 535.Hydraulic Design of Channels and Control Structures. (3)

Prerequisite(s): CE EN 433; or equivalent.

Design of water conveyance channels and control structures, including siphons, chutes, weirs, flumes, dams, spillways, and outlet works.

## 540.Geo-Environmental Engineering. (3)

Prerequisite(s): CE EN 341 & CE EN 351; or equivalents. CE En 471A or 471 B or concurrent enrollment or instructor's consent.

Hazardous waste statutes and regulations; introduction to hazardous waste treatment, storage, disposal, and monitoring techniques. Geotechnical aspects of environmental engineering. Topics include municipal and hazardous solid waste landfill design and characterization and remediation techniques for contaminated soil and groundwater.



**544.Seepage and Slope Stability Analysis. (3)**

Prerequisite(s): CE EN 341; or equivalent.

Seepage and slope stability analysis of earth dams, levees, excavations, embankments, and natural slopes; construction dewatering, numerical methods, shear strength of soils, limit equilibrium method.

**545.Geotechnical Analysis of Earthquake Phenomena. (3)**

Prerequisite(s): CE EN 321 & CE EN 341; or equivalents.

Earthquake magnitude and intensity; design ground motions, elementary dynamics of structures; response spectra; building code provisions; liquefaction and ground failure.

**547.Groundwater Modeling. (3)**

Prerequisite(s): CE EN 341; or equivalent.

Computer simulation of groundwater flow systems; modeling theory, numerical methods, data management, boundary conditions, calibration, and stochastic analysis.

**551.Water Treatment Facilities Design. (3)**

Prerequisite(s): CE EN 351; or equivalent.

Evaluation, selection, and design of water treatment facilities.

**555.Environmental Chemistry. (3)**

Prerequisite(s): CE EN 351; or equivalent.

Chemical theory and calculation supporting analysis of major organic and inorganic constituents in environmental engineering, focusing on theoretical understanding of the chemical processes.

**562.Traffic Engineering: Characteristics and Operations. (3)**

Prerequisite(s): CE EN 361; or equivalent.

Traffic stream characteristics, traffic flow theory, traffic control devices, capacity and level of service, warrants, signal timing and optimization, signal coordination.

**563.Pavement Design. (3)**

Prerequisite(s): CE EN 306 & CE EN 341 & CE EN 361

Design, construction, evaluation, maintenance, and rehabilitation of flexible and rigid pavements; influence of traffic and environmental factors; mechanistic analysis of pavement structures using computer software.

**565.Urban Transportation Planning. (3)**

Prerequisite(s): CE EN 361; or instructor's consent.

Urban transportation planning and decision making, intermodal transportation, land-use transportation interrelationships, transportation demand modeling, site impact analysis, sustainable transportation; livable cities.

**570.(CE En-Me En) Computer-Aided Engineering Software Development. (3)**

Prerequisite(s): Me En 373 or C programming.

Programming methods for the development of engineering software. Data structures, architecture, libraries, and graphical user interfaces, with applications to CAD systems.

**572.(CE En-Me En) Computer-Aided Geometric Design. (3)**

Prerequisite(s): Proficiency in C programming.

Mathematical theory of free-form curves and surfaces and solid geometric modeling. Bezier and B-spline curve and surface theory, parametric and implicit forms, intersection algorithms, topics in computer algebra, and free-form deformation. Several programming projects.

**575.(CE En-Me En) Optimization Techniques in Engineering. (3)**

Prerequisite(s): MATH 302; or MATH 313; C, C++, or similar computer language.

Application of computer optimization techniques to constrained engineering design. Theory and application of unconstrained and constrained nonlinear algorithms. Genetic algorithms. Robust design methods.

**594R.Selected Problems in Civil and Environmental Engineering. (1-3)****602.(CE En-Me En) Composite Structures. (3)**

Prerequisite(s): CE EN 304; or ME EN 372

Design and analysis of advanced composite structures; deflections, buckling, and vibration of thin plates and sandwich plates; design guidelines; design examples; project.

## CIVIL AND ENVIRONMENTAL ENGINEERING

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### **604.(CE En-Me En) Continuum and Solid Mechanics. (3)**

Prerequisite(s): CE EN 321; or ME EN 372

Derivation of partial differential equations of continuum mechanics. Closed-form solution of classical problems in elasticity. Theory of beams, plates, and axisymmetric shells with closed-form solutions. Large displacement strain tensors, stress tensors, equilibrium equations, beam theory, and plate theory. Constitutive theory including nonlinear elasticity, viscoelasticity, plasticity, and hyperelasticity.

### **607.(CE En-Me En) Nonlinear Finite Element Methods. (3)**

Prerequisite(s): CE EN 507; or ME EN 507

Nonlinear dynamic finite element analysis of solids. Nonlinear continuum mechanics, finite element formulation, and elementary solution algorithms for nonlinear algebraic problems. Focusing on hyperelastic solids. Advanced topics in isogeometric analysis, computational analysis-suitable geometry, and adaptivity. An introduction to dynamics; basic methods of time integration, such as Newmark and "alpha" methods.

### **635.Sediment Transport and River Restoration. (3)**

Prerequisite(s): CE EN 535; or CE EN 433 and instructor's consent.

Sediment transport concepts applied to stream restoration and stream restoration concepts including geomorphology and stream classification. Lectures, field trips, guest lecturers.

### **641.Advanced Soil Mechanics. (3)**

Prerequisite(s): CEEEn 341 or equivalent.

Advanced discussion and analysis of shear strength of soils; finite-element stress analysis distribution in soils; critical state soil mechanics, unsaturated soil mechanics.

### **644.Advanced Foundation Engineering. (3)**

Prerequisite(s): CE En 341 or equivalent.

Lateral pressures and earth retaining systems, axial and lateral capacities of piles and drilled shafts, foundations subjected to vibratory loadings, foundations on collapsible and expansive soils, soil improvement techniques.

### **648.Groundwater Contaminant Transport. (3)**

Prerequisite(s): CE EN 547

Fate and transport of contaminants in groundwater. Advection, dispersion, adsorption, biodegradation, and computer simulation focusing on the theory and mathematics used to model these processes.

### **651.Wastewater Treatment Facilities Design. (3)**

Prerequisite(s): CE EN 551

Evaluation, selection, and design of wastewater treatment facilities.

### **654.Water and Wastewater Advanced Treatment Processes. (3)**

Prerequisite(s): CE EN 551

Treatment and disposal of industrial wastes; basic industries and their waste problems.

### **662.Traffic Simulation and Analysis. (3)**

Prerequisite(s): CEEEn 562 or instructor's consent.

Concept of traffic simulation, modeling techniques, calibration and validation, simulation output comprehension, shock wave analysis, queuing theory, use of simulation software.

### **664.Transportation Site Planning. (3)**

Prerequisite(s): CE EN 562

Characteristics of transportation site planning; traffic impact analysis; principles of access design; driveway, site circulation, and parking lot design; permitting of proposed developments.

### **681.Civil Engineering Business Operations. (1.5)**

Prerequisite(s): CE En 471A, 471B, 472; or equivalents.

Different legal forms of business ownership, business performance metrics, accounting, business development, marketing, operations management, market forces and competition and business strategy.

### **682.Civil Engineering Project Management. (1.5)**

Prerequisite(s): CE En 471A, 471B, 472; or equivalents.

Managing diversity, building effective teams, team coaching, evaluations, managing conflict and conflict resolution, project management approaches, risk management, critical path, partnering, managing outside consultants, staffing, negotiations, and principles of leadership.

### **691R.Civil and Environmental Engineering Seminar. (0.5)**

### **694R.Selected Problems in Civil and Environmental Engineering. (1-3)**

### **698R.Master's Project. (1-3)**

Prerequisite(s): Graduate committee's consent.

### **699R.Master's Thesis. (1-9)**

Prerequisite(s): Graduate committee's consent

### **794R.Selected Topics in Civil and Environmental Engineering. (1-3)**

### **797R.Research for Doctoral Students. (1-9)**

### **799R.Doctoral Dissertation. (1-9)**

Prerequisite(s): Graduate committee's consent.

## FACULTY

**Ames, Daniel P.** *Associate Professor*, PhD, Utah State University, 2002. Civil and Environmental Engineering

**Balling, Richard J.** *Professor*, PhD, University of California, Berkeley, 1982. Structural Mechanics

**Borup, M. Brett** *Associate Professor*, PhD, Clemson University, 1985. Environmental Engineering

**Fonseca, Fernando S.** *Associate Professor*, PhD, University of Illinois, 1997. Structures

**Franke, Kevin W.** *Assistant Professor*, PhD, Brigham Young University, 2011. Geotechnical Engineering

**Guthrie, W. Spencer** *Associate Professor*, PhD, Texas A&M University, 2002. Materials and Pavements

**Hotchkiss, Rollin H.** *Professor*, PhD, University of Minnesota, 1989. Hydraulics and Hydrology

**Jensen, David W.** *Professor*, PhD, Massachusetts Institute of Technology, 1986. Structures: Advanced Composites

**Jones, Norman L.** *Professor*, PhD, University of Texas, Austin, 1990. Geotechnical Engineering

**Miller, A. Woodruff** *Professor*, PhD, Stanford University, 1975. Hydrology; Hydraulics

**Nelson, E. James** *Professor*, PhD, Brigham Young University, 1994. Surveying; GIS; Hydrology

**Richards, Paul W.** *Associate Professor*, PhD, University of California, San Diego, 2004. Structural Engineering

**Rollins, Kyle M.** *Professor*, PhD, University of California, Berkeley, 1987. Geotechnical Engineering

**Saito, Mitsuru** *Professor*, PhD, Purdue University, 1988. Transportation Engineering

**Schultz, Grant G.** *Associate Professor*, PhD, Texas A&M University, 2003. Traffic Engineering

**Scott, Michael Andrew** *Assistant Professor*, PhD, The University of Texas at Austin, 2011. Computational Science, Engineering and Mathematics

**Williams, Gustavious P.** *Associate Professor*, PhD, Northwestern University, 1994. Environmental Geotechnology

## COMMUNICATION DISORDERS

**Chair:** Dromey, Christopher  
**Graduate Coordinator:** Channell, Ron W.

136 TLRB, Provo, UT 84602-8605  
(801) 422-4318  
<http://education.byu.edu/comd>

## THE PROGRAMS OF STUDY

The separate but overlapping disciplines represented by the Department of Communication Disorders involve the study of the processes and disorders of hearing, speech, and language. The department integrates principles and methods of acoustics, anatomy, psychology, linguistics, medicine, physiology, and rehabilitation to prepare students to more effectively help persons of all ages who have either congenital or acquired impairments to hearing, speaking clearly, participating in conversations, or any of the other skills that allow effective communication.

The graduate program in the department provides a mixture of academic course work, clinical experience, and research involvement. Students are expected to master knowledge related to treating persons with disorders and to apply this knowledge in clinical activities at BYU and at other professional settings in the community. Strong performance in both course work and clinical activities is required, as is the successful completion and defense of a thesis. Because clinical training requires broad expertise, no clinically relevant topics are excluded from coverage in course work or clinical training; however, student research activities are channeled into topical areas in which faculty have focal expertise.

The master's degree program in the department focuses only on the speech-language pathology

## COMMUNICATION DISORDERS

part of communication disorders and prepares students to (a) work competently with clients of all ages in all professional settings, (b) conduct research and communicate findings to peers and cooperating professionals, (c) meet requirements for national certification, state licensure, and school licensure, (d) qualify for and excel at doctoral study if desired, and (e) maintain currency in the discipline through ongoing, independent study.

About 20 students per year are admitted into the program. Students generally complete their programs in two years.

### **Communication Disorders - MS**

The discipline of speech-language pathology involves the study of the anatomy and physiology of the speech production mechanism, the normal and impaired development of speech, disorders of articulation, voice disorders, stuttering and related disorders of speech rate and rhythm, speech acoustics, speech perception, and swallowing disorders. Speech-language pathology also includes the study of normal and impaired language development and language processing, the assessment of children's language and related social and cognitive abilities, the treatment of language impairments, and the assessment and treatment of aphasia.

#### **Requirements for Degree.**

- Credit hours 48: 37 hours of coursework, 5 hours of clinical practicum (ComD 688R), and 6 hours of thesis (ComD 699R)
- Required courses: ComD 600, 601, 610, 630, 633, 634, 636, 657, 658, 674, 675, 676, 679
- Minor (in related field): optional and in addition to all required major classes.
- Residence: see university residence requirements. Transfer of graduate courses taken elsewhere is not guaranteed and will be evaluated on a course-by-course basis.
- Thesis.
- Examinations: (A) pass ASHA Praxis exam in speech-language pathology; (B) oral defense of thesis.

### **FINANCIAL ASSISTANCE**

Some of the money that is available for financial assistance in the Department of Communication Disorders is given to graduate students in the form of graduate assistantships. These assistantships involve helping faculty in course management or research; awardees are selected by faculty from those applying for assistantships on the basis of suitability for the work needed. Other financial aid is available in the form of supplementary awards such as partial-tuition scholarships; these awards are made on the basis of academic excellence.

### **RESOURCES AND OPPORTUNITIES**

The Department of Communication Disorders is housed in the John Taylor Building and as such is part of the BYU Comprehensive Clinic. This clinic allows speech-language pathology students to work with programs in clinical psychology, marriage and family therapy, and LDS Family Services in interdisciplinary cooperation on a variety of clinical cases. The clinic also allows for shared access to audiovisual services, computers and networks, and tests and therapy materials.

**The BYU Audiology Clinic** focuses on the assessment and treatment of hearing disorders of students, faculty, staff, missionaries from the Missionary Training Center (Provo), and the public. It is also involved in monitoring the hearing ability levels of university employees for

workplace safety compliance and in testing the hearing of central Utah's high-risk babies in collaboration with the Utah State Health Department.

**The BYU Speech and Language Clinic** is staffed by graduate students under faculty supervision and focuses on assessing and treating the speech and language disorders of students, faculty, staff, missionaries, and the public.

#### **Research Facilities and Equipment.**

The facilities supporting research and clinical work include evoked potential and brain mapping, digital audio recording and editing instrumentation, spectrographic, laryngographic, and nasometric analyses of speech and voice production, stroboscopic digital video laryngoscopy, and audiovisual equipment for conversational language sampling and analysis.

## **COURSE DESCRIPTION**

### **COMD**

#### **600.Research Methods. (3)**

Prerequisite(s): Stat 121 or equivalent.

Research methods in audiology and speech-language pathology. Applying statistical techniques; professional literature and writing.

#### **601.Neurofoundations of Language, Speech, and Hearing. (3)**

Neuroanatomy and neurophysiology underlying normal and impaired language, speech, and hearing processes.

#### **610.Assessment and Diagnosis. (3)**

Performing evaluations and determining how assessment informs clinical decision making and intervention in communication disorders.

#### **630.Early Child Language Intervention. (3)**

Theories and practices in language treatment, emphasizing assessment and intervention for developmentally young children.



**633.Dysphagia Management.** (2)  
Assessment and treatment of swallowing disorders.

**634.Traumatic Brain Injury.** (2)  
Assessment and treatment of speech and language problems associated with traumatic brain injury.

**636.Multicultural Issues in Speech-Language Pathology.** (3)  
Prerequisite(s): ComD 350 or equivalent.

Speech and language assessment and intervention with persons from culturally and linguistically diverse backgrounds. Specific topics include cultural diversity, bilingualism, and use of interpreters/translators.

**657.Voice and Resonance Disorders.** (3)  
Assessment and treatment of disorders of the speaking voice.

**658.Fluency Disorders.** (3)  
Assessment and treatment of fluency disorders, including stuttering.

**674.Autism and Severe Disabilities.** (3)  
Assessment and treatment of persons with multiple handicaps, including augmentative communication training.

**675.Motor Speech Disorders.** (3)  
Neuropathology, symptomology, clinical assessment, and treatment of adult motor speech disorders.

**676.Aphasia.** (3)  
Perspectives on the neurology, clinical assessment, and rehabilitation of aphasic language disturbances in adults.

**679.School-Age Language Disorders.** (3)  
Impact, assessment, and treatment of language impairment in children, emphasizing evaluation and intervention for school-aged children.

**688R.Practicum in Communication Disorders.** (1)  
Prerequisite(s): Instructor's consent.

**693R.Directed Individual Study.** (1-3)  
Prerequisite(s): Instructor's consent.

**699R.Master's Thesis.** (1-6)

## FACULTY

**Brinton, Bonnie** *Professor*, PhD, University of Utah, 1981. Child Language Impairment

**Channell, Ron W.** *Associate Professor*, PhD, University of Utah, 1983. Language Acquisition

**Culatta, Barbara** *Professor*, PhD, University of Pittsburgh, 1975. Child Language Impairment

**Dromey, Christopher** *Professor*, PhD, University of Colorado, 1995. Speech and Voice Physiology

**Fujiki, Martin** *Professor*, PhD, University of Utah, 1980. Child Language Impairment

**Harris, Richard W.** *Professor*, PhD, Purdue University, 1978. Hearing Science; Perception

**McPherson, David L.** *Professor*, PhD, University of Washington, 1972. Audiology; Hearing Science; Electrophysiology

**Nissen, Shawn L.** *Associate Professor*, PhD, Ohio State University, 2003. Speech Science

**Tanner, Kristine** *Assistant Professor*, PhD, University of Utah, 2005. Voice Disorders

## COMMUNICATIONS

**Graduate Coordinator:** Robinson, Tom

**Chair:** Carter, Ed

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<http://comms.byu.edu>

## THE PROGRAMS OF STUDY

The Department of Communications offers a broad-based master's program designed to promote critical thinking and research with a particular focus on the interaction between media and society.

The program of study prepares students with the theoretical background, methodological expertise, and critical thinking skills needed both for continued studies at the doctoral level and informed professional practice. It emphasizes communications theory and quantitative and qualitative research methodologies. Specialized topical areas include literature of journalism, communication history, media and religion, international media and communication, communication ethics and law, persuasion, public relations and leadership, and media effects.

One graduate degree is offered through the Communications Department: Mass Communications-MA. A minor in mass communications is also offered.

Approximately fifteen students are admitted to the master's program each fall semester. The anticipated time spent in completing requirements for the master's degree is two years.

### Mass Communications - MA

The master's program is intended to serve as preparation for:

- Doctoral studies where theory, teaching, research, and publication are emphasized.

## COMMUNICATIONS

- Advancement in communications professions.

Beyond the courses required by the department, students select-in consultation with advisors-the specific courses that best meet their goals and interests. Generally, students with non-communications undergraduate majors will be expected to concentrate on communications electives. Those with a communications baccalaureate are encouraged to seek broadening electives outside the department.

### Requirements for Degree.

- Credit hours (33): minimum 27 hours of course work.
- Required courses: Comms 600, 602, 610, 611, 616 (15 hours).
- Electives: 12 credit hours from Comms 604, 607, 612R, 619, 621, 622R, 623, 624, 625, 627, 691R, 692R, 695R, and/or interdisciplinary substitute courses (with prior approval). Electives determined in consultation with advisor and committee.
- Thesis (Comms 699R, 6 hours minimum) or project (Comms 698R, 6 hours minimum).
- Examinations: (A) written comprehensive examination; (B) final oral examination and defense of thesis or project.

### FINANCIAL ASSISTANCE

The principal types of financial aid and awards available to mass communications graduate students are teaching and research assistantships, along with some full- and half-tuition scholarships. Under the direction of faculty, teaching assistants oversee undergraduate classes and labs in advertising, broadcasting, journalism, and public relations. Research assistants work closely with graduate faculty in their research and publication activities. Applications for assistantships and scholarships are available online at [www.byu.edu/gradstudies](http://www.byu.edu/gradstudies).

## RESOURCES AND OPPORTUNITIES

**Facilities.** The Department of Communications is housed in the George H. Brimhall Building. Also affiliated with the department are journalism, advertising, and broadcast laboratories and radio and television studios. Graduate students interested in applied studies may structure work in these media outlets into their programs.

**Communications Research Center.** The Research Center offers state-of-the-art technology and software. Mass communications graduate students have access to staffed statistics and eye-tracking laboratories.

Other resources include a focus group room with audio and video recording capabilities and a social media monitoring center. All resources are supervised by our Director of Communications Research.

*For a more detailed description of the graduate program requirements, go to [comms.byu.edu](http://comms.byu.edu).*

## COURSE DESCRIPTION

### COMMS

**600.Introduction to Graduate Studies in Communications.** (3)  
Introduction to graduate education, communications theory, research, and academic writing. Faculty research programs presented.

**602.Qualitative Research Methods.** (3)  
Major methods of qualitative research used in communications studies.

**604.Communications History and Historical Research Methods.** (3)  
In-depth investigation of the history of mass media, including study of historical research methods.

**607.International Media and Communications.** (3)

Role of communication internationally and its impact on culture, ethics, morality, and politics around the world. Comparison of communication systems, media flows, and communications among countries.

**610.Studies in Communications Theory.** (3)

Nature and content of contemporary mass communication theory.

**611.Communications/Social Science Research Methods.** (3)

Prerequisite(s): Stat 121 or equivalent and/or social science research methods.

Major methods of research used in communications studies.

**612R.Research Practicum.** (1-3)

Practical experience in research under direction of individual faculty.

**616.Media Effects: Individual, Family, and Society.** (3)

Prerequisite(s): Comms 600 or concurrent enrollment.

Media's roles in major social settings. Capstone course, including preparation for comprehensive exams.

**619.Gender, Race, and Class in Mass Communications.** (3)

Issues related to gender, race, and class in the communication process. Implications of current developments in critical theory and issues of diversity.

**621.Media and Religion.** (3)

Seminar regarding the interface of media and religion.

**622R.Seminar on Media and Current Societal Issues. (3)**

Preannounced societal issue or issues ( such as environment, impact of new technologies, vulnerable audiences, consumerism, nonprofits, health communications, terrorism, etc.).

**623.Literature of Journalism. (3)**

Critiquing journalism theories and philosophy ranging from traditional libertarian ideals to contemporary movements of public journalism and public service broadcasting.

**624.Seminar on Media Law and Ethics. (3)**

Review of literature and research on ethics. Legal and regulatory relationship between government and communications; legal research methods.

**625.Integrative Persuasive Communications. (3)**

Persuasion theories and links to practice of integrated communications, including promotion, advertising, public relations, direct marketing, and branding.

**627.Public Relations Theory and Leadership. (3)**

Relationship of strategic communications and stakeholder theory to current issues in the field, including reputation, image, apologia, trust, transparency, power, leadership, conflict resolution, and change.

**691R.Special Studies in Communications. (1-3)**

Prerequisite(s): Approval of committee chair and graduate coordinator.

Individual study with a graduate faculty member.

**692R.Professional Practicum. (1-3)**  
Prerequisite(s): Committee chair and graduate coordinator approval.

Individual work in professional communications settings, with oversight and assessment by graduate faculty member.

**695R.Topical Seminar. (1-3)**

Seminar on focused pre-announced topic relating to specific media issues.

**698R.Master's Project. (1-6)**

**699R.Master's Thesis. (1-6)**

**FACULTY**

**Adams, Edward E.** *Professor*, PhD, Ohio University, 1993. Media Management and Economics

**Baker, Sherry L.** *Professor*, PhD, University of Utah, 1994. Communications and Persuasion Ethics; Cultural History as Evidenced in Media Texts

**Brubaker, Pamela** *Assistant Professor*, PhD, Pennsylvania State University, 2012. Public Relations and Social Media

**Callahan, Loy Clark** *Assistant Professor*, PhD, University of Oklahoma, 2002. Media Ecology; Intercultural Adaptation; Cultural Diffusion

**Callister, Mark A.** *Associate Professor*, PhD, University of Arizona, 1997. Visual Imagery in Print Advertisements; Communication Strategies Within Non-Profit Organizations

**Carter, Edward L.** *Associate Professor*, JD, Brigham Young University, 2003. First Amendment Law and Policy; Media Regulation

**Cressman, Dale L.** *Associate Professor*, PhD, University of Utah, 2003. Broadcast and Print Journalism History

**Cutri, Christopher** *Associate Professor*, MFA, Art Center College of Design, 1997. Creative Advertising

**Davies, John J.** *Assistant Professor*, PhD, University of Alabama, 2004. Uses and Effects of Media; Selective Exposure; Entertainment Theory

**Plowman, Kenneth** *Associate Professor*, PhD, University of Maryland, 1995. Conflict Resolution; Public Relations Management; High-Tech Public Relations

**Randle, Quint B.** *Associate Professor*, PhD, Michigan State University, 2001. Magazines; New Media; Newspapers

**Robinson, Thomas E.** *Professor*, PhD, University of Southern Mississippi, 1996. Portrayal of the Elderly in Media Advertising

**Thomsen, Steven R.** *Professor*, PhD, University of Georgia, 1994. Media Effects; Media and Adolescent Socialization

**Wakefield, Robert I.** *Associate Professor*, PhD, University of Maryland, 1997. International Communication

## COMPARATIVE ARTS AND LETTERS

**Chair:** Handley, George B.

**Graduate Coordinator:** Sederholm, Carl

3008 JFSB, Provo, UT 84602-6702

(801) 422-4448

<http://humanities.byu.edu/>

### THE PROGRAMS OF STUDY

Widely used in the Renaissance, the term humanities (*humanitas* or *studia humanitatis*) refers to the study of human intellectual and artistic creativity. Humanities is both a general academic category (inclusive of literature, history, philosophy, and the history and criticism of art and music) and a discipline in its own right with a methodology for the critical study of intellectual history and aesthetics. The interdisciplinary humanistic fields that the department comprises—humanities, classics, and comparative literature—offer students unusual latitude in pursuing graduate education in the humanities, disciplined by insistence on substantial foreign language skills, competence in critical theory and practice, and the development of scholarly discipline.

One degree is offered through the Department of Humanities, Classics, and Comparative Literature: Comparative Studies-MA. This program admits from five to ten students per year. The MA in comparative studies is designed as a two-year program, and most full-time students are able to complete the MA within two years, usually defending the thesis during spring or summer term of the second year.

### Comparative Studies - MA

This degree allows for study of the humanities within a comparative context not normally found in single-discipline graduate programs—that is, through interdisciplinary and

comparative perspectives that permit a flexibility and breadth of study, without sacrificing rigor. Graduate students thus learn to combine the synthesizing and analytical skills of various humanistic disciplines in order to develop interdisciplinary and comparative approaches to the materials of human culture. Accordingly, program courses expand knowledge in humanistic disciplines and provide intense opportunities to develop wide-ranging research and writing.

#### Requirements for Degree.

- Credit hours (33): minimum 27 course work hours plus 6 thesis hours.
- Required courses: CmpSt 610, 615; two courses from CmpSt 620R, 625R, 630R, 640R, 650R, 660R, 670R.
- Electives: six courses in humanities, classics, comparative literature, art history, musicology, philosophy, history, film, or literature (up to 6 hours may be in upper-division undergraduate classes where equivalent graduate classes are not available). One or more of these may be comparative studies seminars, which, in addition to the two required, are chosen in consultation with the student's academic advisor and are subject to approval of the department's graduate council. No more than one directed readings course may be counted toward the MA degree in comparative studies.
- Special field: proficiency in a second foreign language or in a discipline other than literature (e.g., art history, musicology, philosophy, film, history, etc.), demonstrated by course work or examination, as determined by the student's graduate committee and the program's graduate council.
- Completion of a reading list, which is determined in consultation with a faculty advisor, subject to approval of the department's graduate council.

- Thesis.
- Examination: final written examination on the reading list; thesis defense.

### Art History and Curatorial Studies - MA

The Comparative Arts and Letters department will no longer admit students into the Art History program starting in 2015.

The MA in Art History and Curatorial Studies is designed to prepare students for advanced graduate study at the PhD level and to provide a foundation for students desiring a career in a museum or art gallery. For additional information on this program, visit <http://www.byuarthistory.com/>

#### Requirements for Degree.

- Credit hours (30 hours): minimum of eight ARTHC 500-level seminars (two theory and six topical) plus 6 thesis hours (ARTHC 699R). One 3-hour curatorial museum internship may be taken in place of a topical seminar. Topical seminars beyond the art history area of the Department of Visual Arts and all internships must be approved through the student's committee chair.
- Required courses: the theory core (ARTHC 500, 505) is required. Other seminars will be selected in consultation with the graduate coordinator and graduate committee chair. The MA program is designed to allow maximum exposure to the various areas of art history and curatorial studies.
- Language requirement: reading knowledge of French or German before entering the program; similar competency required in the other of these languages by end of program.



- Select major area of emphasis: ancient, early Christian/Byzantine, medieval, Renaissance, baroque, eighteenth-century, nineteenth-century, American, European modernism, contemporary, curatorial studies.
- Select a graduate committee based on your major area during first semester of studies.
- Examinations: (A) comprehensive exam; (B) oral defense of thesis.
- Thesis.

## FINANCIAL ASSISTANCE

Aid is available in the form of full or partial tuition grants, teaching and research assistantships, internships, and (for advanced students) some student instructorships. Upon admission to the respective programs, candidates will be considered for all of these possibilities based upon merit and availability of department resources. Financial aid is normally limited to two years.

## RESOURCES AND OPPORTUNITIES

The Department of Humanities, Classics, and Comparative Literature utilizes the Humanities Technology and Research Support Center and the Reading-Writing Center for the College of Humanities:

**The Humanities Technology and Research Support Center** provides an array of technological tools, resources, and expertise to foster quality research and scholarship in the College of Humanities. The center is especially active in the production of teaching and research materials. In addition to computer and audio equipment, the center has a variety of video capabilities and in the past few years has become a world leader in computer-assisted language instruction and translation. The department also owns CD ROM databases for classical Greek and Latin texts, the Thesaurus Linguae Graecae and Thesaurus Linguae

Latinae, as well as the complete works of many modern authors. Faculty from the department currently serve as officers in the Classical Association of the Midwest and South (CAMWS), the International Comparative Literature Association (ICLA), the National Association of Humanities Educators (NAHE), the American Conference on Romanticism, and the Society for the Advancement of Scandinavian Study (SASS). In addition, the journals *Scandinavian Studies* and *Prisms: Essays in Romanticism* are edited by department faculty members, assisted by graduate students from the department. For more information, see [http://hccl.byu.edu/programs\\_csma.shtml](http://hccl.byu.edu/programs_csma.shtml). E-mail: [comparativestudies@byu.edu](mailto:comparativestudies@byu.edu).

## COURSE DESCRIPTION

### ARTHC

#### 500. **Art in Theory: Spectatorship.** (3)

Prerequisite(s): Graduate status.

Review and critique of major theoretical approaches in art history, emphasizing the philosophical relationship between viewer and object.

#### 505. **Art in Theory: Language.** (3)

Prerequisite(s): Graduate status.

Review and critique of major theoretical approaches in art history, emphasizing the recent interest in language and semiotics.

#### 520R. **Studies in Ancient Art.** (3)

Selected topics in Egyptian, Greek, and Roman art.

#### 530R. **Studies in Medieval Art.** (3)

Selected topics in early Christian, Byzantine, Romanesque, and Gothic art.

#### 540R. **Studies in Renaissance Art.** (3)

Selected topics in Northern and Southern Renaissance art.

#### 550R. **Studies in Baroque Art.** (3)

Selected topics in northern and southern baroque art.

#### 560R. **Studies in Eighteenth- and Nineteenth-Century Art.** (3)

Selected topics in eighteenth- and nineteenth-century art of Europe and America.

#### 570R. **Studies in Modern and Contemporary Art.** (3)

Selected topics in modern and contemporary art of Europe and America.

#### 590R. **Studies in Curatorship.** (3)

Selected topics in curation and the museum.

#### 595R. **Foreign Language Readings for Art Historians.** (3)

Special instruction in reading French or German scholarly texts.

#### 595R. **French Readings for Art Historians.** (3)

Special instruction in reading French scholarly texts.

#### 595R. **German Readings for Art Historians.** (3)

Special instruction in reading German scholarly texts.

#### 599R. **Academic Internship.** (1-8)

Prerequisite(s): ArtHC graduate student status.

Professional museum experience with a curatorial mentor.

#### 600R. **Individual Study.** (0.5-8)

In-depth study into any chosen art-historical era.

#### 699R. **Master's Thesis.** (0.5-6)

## COMPARATIVE ARTS AND LETTERS

### **CMPST**

#### **610.Introduction to Contemporary Critical Thinking.** (3)

Prerequisite(s): CmLit 310, Hum 350, Clsscs 420; or equivalents.

A broad interdisciplinary perspective on contemporary literary and aesthetic theory and critical methods as these relate to the study of literature and the arts.

#### **615.Colloquium in Comparative Studies.** (3)

Prerequisite(s): CMPST 610

Introduction to a variety of critical methods through presentations of work in progress by graduate and visiting faculty. Topics vary.

#### **620R.Studies in Periods and Movements.** (3)

Prerequisite(s): CMPST 610

Literature, philosophy, and/or the arts of a particular period or movement in cultural history. Problems of periodization. Topics vary.

#### **625R.Area Studies.** (3)

Prerequisite(s): CMPST 610

Literature, philosophy, and/or the arts of a particular geographical area. Topics vary.

#### **630R.Studies in Genres and Forms.** (3)

Prerequisite(s): CMPST 610

Topics vary and include epic, tragedy, comedy, narrative, historiography, film.

#### **640R.Studies in Themes and Types.** (3)

Prerequisite(s): CMPST 610

Topics vary and include Eden, Arthur, Don Juan, Faust, Don Quixote, Ulysses, Troy.

#### **650R.Interrelations of the Arts.** (3)

Prerequisite(s): CMPST 610

Interrelations between various art forms, especially literature and one other art (literature and art, film, music, etc.). Topics vary.

#### **660R.Critical Theory and Methods.** (3)

Prerequisite(s): CMPST 610

Theoretical and practical criticism; problems in critical theory. Topics vary and include aesthetics, cultural theory, aspects of contemporary theory.

#### **670R.Studies in the Classical Tradition.** (3)

Prerequisite(s): CMPST 610

Studies in the cultures of classical antiquity and their influence on later cultural history. Topics vary.

#### **680RDirected Readings.** (3)

#### **699R.Master's Thesis.** (1-9)

Prerequisite(s): Graduate coordinator's consent.

### **GREEK**

#### **620R.Greek Poets.** (3)

Prerequisite(s): 400-level Greek poetry course or equivalent.

Detailed study of one major Greek poet or poets. Topics vary.

#### **625R.Greek Prose Writers.** (3)

Prerequisite(s): 400-level Greek prose course or equivalent.

Detailed study of one major Greek prose author or authors. Topics vary.

#### **640R.Studies in Genre.** (3)

Prerequisite(s): 400-level Greek course or equivalent.

Major genres (epic, tragedy, comedy, historiography, etc.). Topics vary.

### **LATIN**

#### **620R.Latin Poets.** (3)

Prerequisite(s): 400-level Latin poetry course or equivalent.

Detailed study of a major Latin poet or poets. Topics vary.

#### **625R.Latin Prose Writers.** (3)

Prerequisite(s): 400-level Latin prose course or equivalent.

Detailed study of a major Latin prose writer or writers. Topics vary.

#### **690R.Seminar in Latin.** (3)

Prerequisite(s): 400-level Latin course or equivalent.

Graduate seminar on one topic in Roman literature, culture, and history. Topics vary.

### **FACULTY**

**Ancell, Matthew** *Assistant Professor*, PhD, University of California, Irvine, 2007. Humanities; Seventeenth-Century Spanish and English Literature and the Arts

**Bay, Stephen M.** *Assistant Professor*, PhD, University of Illinois, Urbana-Champaign, 2006. Classics; Classical Textual Criticism; Papyrology; Ancient Prose Fiction

**Benfell, V. Stanley** *Professor*, PhD, New York University, 1994. Comparative Literature; Medieval and Renaissance Literature (Italian, French, English)

**Call, Michael Josiah** *Assistant Professor*, PhD, Yale University, 2007. Humanities; Seventeenth-Century French Literature and Culture

**Christenson, Allen J.** *Professor*, PhD, University of Texas, Austin, 1998. Humanities; Precolombian Maya and Mesoamerican Literature, Art, and Culture; Early Modernism; North American Art and Culture; Latin American Culture

**Colson, Robert L.** *Assistant Professor*, PhD, University of California, Irvine, 2010. Humanities; Modernism; Post-Colonial Studies; Narrative Theory

**Handley, George B.** *Professor*, PhD, University of California, Berkeley, 1995. Humanities; Nineteenth- and Twentieth-Century American, Caribbean, and Latin American Culture; Ethnic Arts; Cultural Theory

**Kramer, T. Nathaniel** *Associate Professor*, PhD, University of California, Los Angeles, 2004. Humanities; Twentieth-Century Literature; Scandinavian Studies; European Modernism; Literary Theory

**Lawson, Francesca** *Associate Professor*, PhD, University of Washington, 1988. Humanities; Ethnomusicology; Chinese Narrative Performance

**Macfarlane, Roger T.** *Associate Professor*, PHD, University of Michigan, 1991. Classics; Republican and Augustan Latin Literature

**Oscarson, Christopher** *Associate Professor*, PhD, University of California, Berkeley, 2006. Humanities; Nineteenth- and Twentieth-Century Scandinavian Literature; Film

**Parry, Joseph D.** *Professor*, PhD, University of Utah, 1995. Humanities; Medieval and Renaissance Studies (especially English, German, Italian)

**Peek, Cecilia M.** *Associate Professor*, PhD, University of California, Berkeley, 2000. Classics; Hellenistic History; Roman Imperial History; Greek and Latin Literature

**Peer, Larry H.** *Professor*, PhD, University of Maryland, College Park, 1969. Comparative Literature; Romanticism; Theory

**Sederholm, Carl H.** *Associate Professor*, PhD, University of Utah, 2002. Humanities; Early American Literature and Culture; American Gothic; American Religion; Popular Culture; Cultural Theory

**Sondrup, Steven P.** *Professor*, PhD, Harvard University, 1974. Comparative Literature; Nineteenth- and Twentieth-Century Literature

**Soper, Kerry D.** *Associate Professor*, PhD, Emory University, 1998. Humanities; Nineteenth- and Twentieth-Century American Studies; Popular Culture

**Stanford, Charlotte** *Associate Professor*, PhD, Pennsylvania State University, 2003. Medieval Studies; Art History; Gothic Architecture; Gothic Revival

## COMPUTER SCIENCE

**Chair:** Goodrich, Michael A.  
**Associate Chair:** Ventura, Dan

3361 TMCB, Provo, UT 84602-6576  
(801) 422-3027  
[graduate@cs.byu.edu](mailto:graduate@cs.byu.edu)  
<https://cs.byu.edu/>

## THE PROGRAMS OF STUDY

The Department of Computer Science offers two degrees: an MS in Computer Science and a PhD in Computer Science.

The MS degree is designed to prepare students either to be technically capable of leading development teams in industrial software development or to be ready to continue on for a PhD. The PhD degree prepares students to be researchers and teachers either in industry or academia. Areas of particular emphasis are listed under Resources and Opportunities and under research faculty interests.

The expected duration of the MS program for full-time students who enter without deficiencies is one and a half years. Depending on the number of deficiencies, some students may require additional semesters. Students may not enter the PhD program with deficiencies. For full-time students in the PhD program, the expected duration is three years for those entering the program with an MS in computer science and from four to four and a half years for those entering without an MS in computer science. These expectations assume that students take a full graduate load and begin and complete the steps in their thesis or dissertation research in a timely manner.

## Computer Science - MS

**Mission Statement.** Students in the Master of Science program in the Computer Science Department are prepared to be technical problem solvers, are competent in the state of the art, and have mastered a

## COMPUTER SCIENCE

particular aspect of Computer Science. All students are active in at least one of the Department's research labs and work closely with a faculty advisor in the completion of their M.S. thesis. Consequently, they are able to engage in further research where computers will have a significant impact. M.S. graduates are an asset to their employers as they demonstrate increased insight into solving problems, and are able to manage and complete significant projects. Graduates are prepared with a solid background in both theoretical foundations and practical training for the lifelong learning necessary in this fast-moving field.

### Requirements for Degree.

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (C S 699R).
- Required courses: determined in consultation with graduate committee.
- Thesis: departmental acceptance of thesis proposal before beginning thesis research.
- Examinations: oral defense of thesis.
- While in the MS program, students are expected to make steady and satisfactory progress toward their degree. Progress reviews take place three times each year. Students who fail to make appropriate progress will be dropped from the program.

### Computer Science - PhD

**Mission Statement.** Ph.D. students in the Computer Science Department are prepared to be technical problem solvers, are competent in the state of the art, and have mastered a particular aspect of Computer Science. They are trained to identify and clearly formulate problems, to develop and analyze algorithmic solutions, and to direct research. All Ph.D. students are active in one of the Department's research labs, working closely with a faculty advisor. Ph.D. graduates make a novel contribution to Computer Science in the form

of a dissertation and scholarly publications. They are an asset to their employers, as they demonstrate increased insight into formulating and solving problems. Furthermore, they have the skills to see the discipline clearly and to lead out on their own. Graduates are prepared with a solid background in both theoretical foundations and practical training for the lifelong learning necessary in this fast-moving field.

### Requirements for Degree.

- Credit hours (66): minimum 48 course work hours plus 18 hours of dissertation research (CS 799R). Course work must include C S 611 and may also include up to 30 hours of credit transferred from a completed MS degree.
- Qualifying process: (A) pass courses demonstrating broad proficiency in computer science and (B) produce and present a satisfactory research paper.
- Dissertation proposal: demonstrate preparedness to do dissertation research by (A) presenting an overview of the dissertation research area, and (B) proposing a research program within the context of this area.
- Dissertation
- Dissertation defense: make an oral presentation that defends the dissertation research.
- Residency: PhD students are expected to be resident for the full duration of their PhD program. Exceptions may be granted if the advisor and graduate committee approve (in advance) a leave of absence.
- Teaching: all students must teach at least one course.
- While in the PhD program, students are expected to make steady and satisfactory progress toward their degree. Progress reviews take place three times each year. Students who fail to make appropriate progress will be dropped from the program.

## FINANCIAL ASSISTANCE

The Computer Science Department recognizes that most students require financial assistance to remain in school. The department has funds in the following forms: teaching and research assistantships and tuition awards.

## RESOURCES AND OPPORTUNITIES

The Computer Science Department offers research in the following areas:

Artificial intelligence and machine learning  
Computational science and control  
Computer networks, systems, and security  
Data and text analytics  
Graphics and computer vision  
Human-computer interaction and software development

*For more detailed information please see our Web site: [www.cs.byu.edu](http://www.cs.byu.edu)*

## COURSE DESCRIPTION

### C S

#### 500.(C S-Chem-Geol-Math-MthEd-Phscs-Stat) Business Career Essentials in Science and Math. (1.5)

Introduction for science, math, and statistics majors to careers in industry. Project planning, oral and written business presentations, business accounting, and technology readiness.

#### 501R.Advanced Topics in Computer Science. (1-3)

Prerequisite(s): Instructor's consent.

Advanced undergraduate- and graduate-level subjects as announced before each semester.

#### 513.Robust Control. (3)

Prerequisite(s): Math 313 or equivalent.

Introduction to the analysis and design of feedback systems guaranteed to perform well in spite of model uncertainty.



**557.Computer-Aided Geometric Design. (3)**

Prerequisite(s): C S 240, Math 343; or equivalents.

Free-form curves and surfaces; mathematical theory and algorithms. Bezier and B-spline curves and surfaces, subdivision surfaces, T-splines, free-form deformation, and intersection algorithms. Several programming projects.

**601R.Graduate Topics in Computer Science. (3)**

Prerequisite(s): Instructor's consent.

Graduate-level subjects and new graduate courses as announced before each semester.

**611.Theoretical Foundations of Computing. (3)**

Prerequisite(s): CS 252 or equivalent; CS 312 or instructor's consent.

Proofs (deductive and inductive reasoning), computability (models of computability and computability issues), and complexity (time and space bounds, nondeterminism, and complexity classification).

**618.Computational Biology. (3)**

Prerequisite(s): C S 240, 252, 312; or equivalents.

Algorithms for DNA sequence analysis. Heuristics analyzed and developed for NP-complete problems including alignment, phylogeny, secondary structure predictions, protein folding, and microarray analysis.

**628.Empirical Software Engineering. (3)**

Prerequisite(s): C S 428 or equivalent.

Empirical research in software engineering. Experimental and observational studies, statistical methods, and historically relevant search results.

**630.Advanced Programming Languages Theory. (3)**

Prerequisite(s): C S 330 or equivalent.

Advanced coverage of the theory of the design, implementation, and semantics of programming languages and type systems.

**650.Computer Vision 1. (3)**

Prerequisite(s): CS 450 or equivalent.

Machine vision, image segmentation, mathematical morphology, image enhancement and filtering, edge detection, feature extraction, neighborhood operators, region growing, boundary detection, scene segmentation, and matching.

**652.Information Extraction and Integration. (3)**

Prerequisite(s): C S 452 (or equivalent) and/or 553.

Information extraction from structured, semistructured, and unstructured documents, including Web documents; integrating heterogeneous source information; theoretical foundations of information modeling; topics of current interest.

**653.Information Retrieval. (3)**

Prerequisite(s): CS 236 or equivalent.

IR modeling, IR query languages, text indexing and searching, retrieval evaluation, query and text operations, parallel and distributed IR, Web searching.

**655.Advanced Computer Graphics. (3)**

Prerequisite(s): CS 455 or instructor's consent.

Advanced computer graphics systems programming and architecture, including ray tracing, radiosity, animation, and physically based modeling.

**656.Interactive Software Systems. (3)**

Prerequisite(s): CS 330, 456; or instructor's consent.

Advanced techniques for interacting with humans using pen-based, speech-based, hand-held, wall-sized, and room-sized devices. Embedding computing in everyday objects.

**658.Computer Generated Natural Phenomena. (3)**

Prerequisite(s): C S 455 or instructor's consent.

Algorithms which model natural phenomena for use in computer-generated images and animation, including visually plausible models of plants, terrain, fluids, and the sky.

**660.Computer Networks. (3)**

Prerequisite(s): CS 460 or equivalent.

Computer networking, software architecture, organization, protocols, routing, global networks, local networks, internetworking, standards, and applications.

**665.Advanced Computer Security. (3)**

Prerequisite(s): CS 465 or instructor's consent.

Authentication and authorization using digital credentials.

**670.Multi-Agent Systems. (3)**

Prerequisite(s): CS 470 or equivalent; CS 478 or instructor's consent.

Introduction to fundamental concepts emphasizing current literature. Topics include game theory, repeated play games, Arrow's impossibility theorem, negotiation, search, and learning.

**673.Computational Creativity. (3)**

Prerequisite(s): C S 470 or 478 or instructor's consent.

Project-based course for understanding creativity as a way to increase the robustness of intelligent systems while applying AI/ML tools to challenging problems.

**676.Advanced Topics in Data Mining. (3)**

Prerequisite(s): C S 478 or equivalent.

Data mining process, data warehousing concepts, text mining, ethical issues, meta-learning, and key success factors.

## COMPUTER SCIENCE

### **677. Bayesian Methods in Computer Science. (3)**

Prerequisite(s): CS 470 or instructor's consent.

Applying Bayesian methods useful for incorporating confidence or belief into problems in computer science, allowing computers to better handle uncertainty.

### **678. Advanced Neural Networks and Machine Learning. (3)**

Prerequisite(s): CS 478 or equivalent.

Advanced models, algorithms, and approaches in neural networks and machine learning.

### **679. Advanced Natural Language Processing. (3)**

Prerequisite(s): One or more of C S 401R, 478, 479, 677, Stat 551, 651 (or equivalents).

Exploratory data analysis in large collections of text particularly emphasizing techniques for text classification, text clustering, and topic identification.

### **686. Advanced Model Checking. (3)**

Prerequisite(s): CS 486 or equivalent.

Techniques for managing state explosion and specialized algorithms for verifying classes of infinite state systems.

### **698R. Graduate Special Projects. (1-3)**

Prerequisite(s): Instructor's consent.

Graduate-level special projects and mentored learning experiences.

### **699R. Master's Thesis. (0.5-6)**

Prerequisite(s): Committee chair's consent.

### **705. Scholarship in Computer Science. (3)**

Prerequisite(s): Instructor's consent.

Computer science scholarship, including research methods, literature review, course instruction, and writing, presenting, and evaluation of computer science research work.

### **712R. Topics in Algorithmic Decision Processes. (1-3)**

Prerequisite(s): C S 412 and instructor's consent.

Latest research in the field of algorithmic decision processes. Recent papers read, presented, and discussed.

### **750. Computer Vision 2. (3)**

Prerequisite(s): C S 650

Advanced topics in computer vision: radiometric model; photometric stereo; shape from shading; monocular, binocular models; perspective projective geometry; image matching; depth from stereo; exterior, relative, interior, absolute orientation; optical flow.

### **755R. Topics in Computer Graphics. (3)**

Prerequisite(s): C S 655 and instructor's consent.

Latest research in the field of computer graphics. Recent papers read, presented, and discussed.

### **778R. Topics in Neural Networks and Machine Learning. (3)**

Prerequisite(s): C S 678

Advanced topics and readings in neural networks and machine learning.

### **786R. Readings in Model Checking. (3)**

Prerequisite(s): C S 686

Focused readings and projects as suggested by class interest and current trends.

### **799R. Doctoral Dissertation. (0.5-18)**

Prerequisite(s): Committee chair's consent.

## FACULTY

**Adams, R. Brent** *Professor*, MFA, University of Utah, 1992. 3-D Computer Graphics; Animation

**Barrett, William A.** *Professor*, PhD, University of Utah, 1978. Computer Vision; Image Processing; Pattern Recognition

**Burton, Robert P.** *Professor*, PhD, University of Utah, 1973. Hyperdimensional Computer Graphics; Visualization

**Clement, Mark J.** *Professor*, PhD, Oregon State University, 1994. Parallel Processing; Bioinformatics; Computational Sciences

**Egbert, Parris K.** *Professor*, PhD, University of Illinois, 1992. Computer Graphics; Visualization; Virtual Reality; Animation

**Farrell, Ryan** *Assistant Professor*, PhD, University of Maryland, 2011. Computer Vision

**Flanagan, J. Kelly** *Professor*, PhD, Brigham Young University, 1993. Computer Architecture; Performance Evaluation; Digital System Design

**Giraud-Carrier, Christophe G.** *Associate Professor*, PhD, Brigham Young University, 1994. Data Mining; Machine Learning; Computational Health Science

**Goodrich, Michael A.** *Professor*, PhD, Brigham Young University, 1996. Human-Robot Interaction; Artificial Intelligence

**Holladay, Seth** *Assistant Professor*, PhD, Brigham Young University, 2013. Animation

**Jones, Michael D.** *Associate Professor*, PhD, University of Utah, 2001. Computer Generated Natural Phenomena; Computer Graphics; Animation

**Martinez, Tony** *Professor, PhD,*  
University of California, Los  
Angeles, 1986. Machine Learning;  
Neural Networks

**Mercer, Eric G.** *Associate Professor,*  
PhD, University of Utah, 2002.  
Software Testing, Debug,  
Verification, and Analysis

**Morse, Bryan S.** *Professor, PhD,*  
University of North Carolina,  
1994. Computational Vision;  
Image Processing; Medical  
Imaging; Computer Graphics

**Ng, Dennis** *Associate Professor, PhD,*  
Kansas State University, 1991.  
Information Retrieval, Database  
System

**Olsen, Dan R.** *Professor, PhD,*  
University of Pennsylvania, 1981.  
Human-Computer Interfaces;  
Programming Environments;  
Computer Graphics

**Ringger, Eric K.** *Associate Professor,*  
PhD, University of Rochester,  
2000. Natural Language  
Processing; Text Mining

**Seamons, Kent E.** *Associate Professor,*  
PhD, University of Illinois, 1996.  
Security; Privacy; Usable Security

**Sederberg, Thomas W.** *Professor,*  
PhD, Purdue University, 1983.  
Computer Graphics; Computer-  
Aided Geometric Design

**Seppi, Kevin** *Associate Professor,*  
PhD, University of Texas, 1990.  
Bayesian and Other Models for  
Artificially Intelligent Decision  
Making

**Snell, Quinn O.** *Professor, PhD,* Iowa  
State University, 1997. Parallel  
Programming; Bioinformatics;  
Computational Sciences

**Ventura, Dan** *Professor, PhD,*  
Brigham Young University, 1998.  
Machine Learning; Artificial  
Intelligence; Computational  
Creativity

**Warnick, Sean C.** *Associate Professor,*  
PhD, Massachusetts Institute of  
Technology, 2003. Control Theory;  
Optimization; Information and  
Decision Algorithms

**Zappala, Daniel M. A.** *Associate  
Professor, PhD,* University of  
Southern California, 1990.  
Computer Networks; Wireless  
Networking, Internet Applications  
and Infrastructure

## COUNSELING PSYCHOLOGY AND SPECIAL EDUCATION

*Chair:* Smith, Timothy B.  
*Counseling Psychology Graduate  
Coordinator:* Jackson, Aaron P.  
*School Psychology Graduate  
Coordinator:* Heath, Melissa  
*Special Education Graduate  
Coordinator:* Ashbaker, Betty Y.  
*Counseling Psychology Graduate  
Coordinator:* Jackson, Aaron P.

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<http://education.byu.edu/cpse>

## THE PROGRAMS OF STUDY

The Department of Counseling Psychology and Special Education prepares educators and professionals who work with individuals, small groups, and organizations/systems. The programs offered in the department all pursue at least two common goals. The first is to help individuals enhance the quality of their lives through meaningful personal, educational, and career development. A second common goal is to assist people in overcoming barriers to learning and to experience success and happiness in life. These barriers include unsupportive environments and individuals' difficulties in thinking, learning, making decisions, relating to others, understanding the impact of their behavior, and so forth.

Faculty implement a scientist-practitioner model through which students and faculty enhance learning through research and inquiry. Further, in dealing with those whom they serve, students apply the principles learned from research evidence. Since their work is often highly personal, it is essential that students possess and develop integrity, using professional standards of ethical conduct. They must also develop the knowledge and skills essential to promote positive change in individuals struggling with important aspects

## COUNSELING PSYCHOLOGY AND SPECIAL EDUCATION

of their lives. The settings in which graduates typically serve include public and private schools, colleges, and universities.

Each program assists students in planning individual course work, receiving supervised practical experience, and obtaining appropriate credentials (certification and licensure).

Three degrees are offered through the Department of Counseling Psychology and Special Education: Special Education-MS; School Psychology-EdS; and Counseling Psychology-PhD.

The average number of students admitted varies by program as follows:

- Special Education - 6, every year
- School Psychology - 12, every year
- Counseling Psychology - 6, every year

### ***School Psychology - EdS***

The EdS degree in school psychology prepares students to pursue credentialing as school psychologists in K-12 educational settings and is approved by the National Association of School Psychologists (NASP) through December 2019. Knowledge and competency areas include counseling (individual and group); responsive services; consultation with parents, teachers, school administrators, and other professionals; child and adolescent emotional and social needs; learning theory; promotion of healthy growth and development; prevention and early intervention; assessment leading to intervention with educational, personal/ social, career, and mental health issues; multicultural counseling; historical and educational foundations; professional roles and expectations; ethics; family and institutional systems; and research and evaluation.

This thesis program requires full-time day attendance. Students are placed in practicum early in the program. The 1200-hour internship is completed at sites where psychological and educational services are provided under the supervision of an appropriately credentialed school psychologist and a university faculty supervisor.

### **Requirements for Degree.**

- Credit hours: minimum 70 hours of approved course work including practica, internship, and thesis hours.
- Required courses: consult department program documents.
- Residence: full-time day attendance first two years, followed by a 1200-hour internship in a school setting.
- Examination: PRAXIS exam and portfolio.
- Internship: see department program documents for specifics.

### ***Special Education - MS***

The program in special education prepares graduate students to provide collaborative leadership to foster the moral development and improve learning and social competence of exceptional children with challenging behaviors. In order to prepare special educators to work collaboratively with multidisciplinary teams in their schools, the program models cooperative teaming and teaching with faculty and students in School Psychology and Teacher Education.

Although the focus of the program is to enhance the knowledge and skills of currently practicing special educators, expectations for research-based practices are integrated into the program, culminating in a written thesis.

Courses are taught in the evenings to accommodate school teachers' schedules during Fall, Winter, and

Spring. Summer enrollment is also required. Because the program does

not require full-time registration, this program does not meet international student registration requirements.

### **Requirements for Degree.**

- Credit hours: 36 hours minimum.
- Required courses: CPSE 601, 614, 615, 618, 619, 620, 673, 688R and 699R; plus five hours of electives.
- Residence: part-time evening class attendance; required Spring/Summer term enrollment.
- Examinations: oral defense of thesis and comprehensive evaluation of content knowledge.

### ***Counseling Psychology - PhD***

The PhD in counseling psychology is accredited by the American Psychological Association (Committee on Accreditation), 750 First Street NE, Washington, DC 20002; phone: (202) 336-5979; fax: (202) 336-5978. It is psychological in nature and is based on the scientist-practitioner model of training. The scientist-practitioner model is an integrated approach to training that acknowledges the interdependence of theory, research, and practice.

The counseling psychology program at BYU emphasizes the educational, developmental, and preventive functions of counseling psychologists. Students are primarily prepared to work as counseling psychologists in counseling centers and in academic departments in university and college settings. Students are also prepared to make remedial interventions. Graduates typically accept positions as counselors or psychologists in college or university counseling centers or as scholars/faculty members in counseling psychology or counselor education programs. Others serve in agencies or private practice as licensed psychologists.



### Requirements for Degree.

- Credit hours: 106 plus dissertation and internship.
- Required courses: consult department program documents.
- Residence: minimum two consecutive full-time semesters while matriculated in the doctoral program (minimum 6 credit hours each semester) on the BYU Provo campus.
- Skill requirement: consult department.
- Pre-doctoral internship (2,000 hours).
- Dissertation.
- Examinations: (A) counseling performance evaluations; (B) written comprehensive examination at completion of course work; (C) oral defense of dissertation.

### FINANCIAL ASSISTANCE

**Graduate Assistantships.** Graduate assistantships include working with selected faculty members on research projects, curriculum development, and other assignments for 5 to 20 hours per week. Several other organizations on campus, such as the Counseling and Psychological Services, often request students to serve as graduate assistants.

#### CPSE Partial-Tuition Scholarships.

Applications are awarded on the basis of scholarship and financial need. Contact the department secretary for application forms, deadlines, and additional information about departmental financial assistance.

**MSE Scholarships.** A small number of modest, specific-interest scholarships are also available. Students may apply through the CPSE department.

**University Financial Aid and Scholarships.** Other sources of financial aid are available to students through the Financial Aid Office, A-41 ASB, Provo, UT 84602-1009.

International students can contact the International Students Services Office at [internationalservices.byu.edu](http://internationalservices.byu.edu), then select the "Scholarship" link.

BYU Graduate Studies offers several sources for support such as Graduate Mentoring Awards and Graduate Student Research Fellowship Awards.

### RESOURCES AND OPPORTUNITIES

**Computer Laboratories.** Computer laboratories provide graduate students access to the university's computers, enabling students to use several programs, such as SPSS and SAS, to analyze research data. These terminals also permit access to the Internet, library databases, etc. Wireless connections are also available in many locations on campus.

**Graduate Student Project and Research Laboratory.** Space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

**Study Areas.** Graduate study areas are available in the CPSE Graduate Lab, the McKay School of Education Technology Education Computing Lab, and the Harold B. Lee Library.

*For a more detailed description of the graduate program requirements, view the department Web page.*

### COURSE DESCRIPTION

#### CPSE

##### 601.Current Issues and Research: Principles of Behavior. (3)

Prerequisite(s): Admission to special education master's program or instructor's consent.

Introduction to the current issues and research behind the principles, concepts, and experimental foundation of behavior analysis.

##### 602.Child and Adolescent Social/Emotional Assessment and Intervention. (3-4)

Prerequisite(s): Admission into CPSE graduate program.

Theory of assessment and intervention for youth with behavioral, social, and emotional problems. Evidence-based interventions focusing on individual, group, and school-wide application. Assessments are aligned with DSM-V and IDEA identification systems. Interventions focus on evidence-based practice.

##### 605.Ethics, Professional Roles, and Standards. (3)

Prerequisite(s): Admission to one of the CPSE graduate programs.

Introduction to the profession of school psychology; ethics, professional roles, and standards of practice, focusing particularly on school-based settings.

##### 606.Psychoeducational Foundations. (3)

Basic educational and counseling philosophy; tests and measurement theory; professional roles and challenges; the school counselor--psychologists' personal impact on students and programs.

##### 607.Bilingual Assessment. (1.5)

Prerequisite(s): CPSE graduate major status.

Assessment and educational intervention for children from non-English-language and other diverse backgrounds. Utilizing nonverbal and alternative forms of assessment.

##### 608.Biological Basis of Behavior. (3)

Prerequisite(s): CPSE graduate major status.

Biological basis of human behavior: relationship between neurological processes and behavior; medications used in treating various disorders.

## COUNSELING PSYCHOLOGY AND SPECIAL EDUCATION

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### **609. Academic Assessment and Interventions. (4)**

Prerequisite(s): CPSE 532 or equivalent; admission into CPSE graduate program.

Curriculum-based evaluation integrated with standardized academic assessment of reading, writing, and math. Identifying academic needs; developing research-based interventions; setting goals; monitoring progress; and adapting interventions as needed.

### **610. Consultation Within School and Family Systems. (3)**

Models and methods of consultation with teachers, parents, and professionals.

### **611. Special Education Law, Regulations, and Policies. (1.5)**

Prerequisite(s): CPSE graduate major status.

Overview of laws, regulations, and policies related to special and general education and professional practice in school psychology.

### **613. Autism Spectrum Disorders. (1-3)**

Prerequisite(s): Admission into CPSE graduate program or instructor's consent.

Overview of characteristics, etiology, and prevalence of Autism Spectrum Disorders (ASD); teaches strategies and skills supporting children's learning and daily functioning; review of instruction strategies, classroom organization, and teaming with families and professionals.

### **614. Applied Behavioral Assessment and Intervention. (3)**

Functional assessment of behaviors using formal and informal behavioral observations. Utilizing collected data to develop and monitor behavioral interventions.

### **615. Academic and Behavioral Problem Solving via MTSS. (3)**

Prerequisite(s): Admission to a graduate program.

Principles, procedures, and strategies for academics and classroom behavior management using Multi-Tiered System of Supports and evidence-based practices to assist at-risk learners in mastering academic and behavioral competencies for success in school and life.

### **618. Ethics, Professional Conduct, and Legal Issues in Special Education. (3)**

Prerequisite(s): Admission to special education master's program or instructor's consent.

Core professional and ethical compliance principles, laws and regulations to guide policy issues, and problem solving using a legal reference for working with students who are at risk.

### **619. Positive Behavior Support: Managing Challenging Behaviors. (3)**

Prerequisite(s): CPSE 601

Prepares special educators to treat challenging problem behaviors. Building on universal behavioral strategies by using targeted and intense interventions required for students with severe behavioral challenges, referred to as Tiers 2 and 3 problems.

### **620. Evidence-Based Academic Intervention for RTI. (3)**

Prerequisite(s): CPSE 601; CPSE 614 or 615; CPSE 688R; CPSE 699R.

Prepares learners to work collaboratively within a school-wide multi-tiered system of support to assess individual student academic needs, to use data to plan instruction, to monitor student progress and make changes as needed.

### **622. Theories of Learning and Cognition. (3)**

Learning and cognitive development theories and their application to attitudinal and behavioral change.

### **629. (CPSE - IP&T) Introduction to Research. (3)**

Introduction to the design options available for conducting basic and applied educational research and how to read and write research reports. Quantitative, qualitative, and mixed methods along with ideas for protecting human subjects are discussed.

### **644. Career Development and Assessment. (3)**

Theories of career development in lifespan and career counseling. Assessing interests, values, and other characteristics related to career decision making.

### **646. Counseling Theory and Interventions. (3)**

Various theories of counseling, current research, processes, and micro-skills training for interviewing and relationship building.

### **647. Psychometric Foundations and Assessment of Intelligence. (3)**

Prerequisite(s): Admission to graduate study in counseling/ school psychology or counseling psychology.

Testing and measurement theory and experience in administering, scoring, and interpreting various standardized and individual intelligence tests.

### **648. Group Counseling and Intervention. (3)**

Primarily group approaches to personal and social counseling and guidance, including skill-streaming groups, divorce and loss groups, parent education groups, grief therapy interventions, and problem-focused interventions.

**649.Human Growth and Development. (3)**

Psychoeducational aspects of developmental theory across the life span, including psychosocial, moral, ego, cognitive, faith, and identity. Developmental implications in the counseling process.

**650.Social Psychology. (3)**

Current theories and research on social interactions and their implications for understanding human thoughts, feelings, and behavior.

**651.(CPSE - IP&T) Statistics 1: Foundations. (3)**

Emphasis on conceptual understanding and practical application of descriptive and basic inferential statistics to decision making.

**653.(CPSE-IP&T) Qualitative Research 1 (Intro to Qualitative Research). (3)**

Prerequisite(s): CPSE 629

Provides an introduction to qualitative inquiry in education, emphasizing major assumptions of qualitative research, a survey of prominent qualitative approaches, differences between various qualitative approaches and more traditional qualitative strategies, and practice with basic qualitative research skills such as interviewing, transcription, data analysis, and report writing.

**655.Crisis Intervention. (3)**

Human crises; preventive, developmental, and remedial interventions within school and family systems.

**656.Spiritual Values and Methods in Psychotherapy. (3)**

Spiritual values and perspectives, issues, and approaches in counseling and psychotherapy.

**673.Single-Subject Research Design. (3)**

Prerequisite(s): Admission to special education master's program or instructor's consent.

Application of applied behavior analysis in designing and conducting single-subject research in school and other applied settings.

**678R.Practicum in School Psychology. (1-3)**

Prerequisite(s): Admission into a CPSE graduate program.

Supervised experiences in observing, planning, and implementing effective assessment, intervention, and monitoring strategies in school settings.

**679R.Practicum in Counseling Psychology. (1-3)**

Prerequisite(s): Admission into a CPSE graduate program.

Clinical experience in individual counseling, group counseling, consultation, testing, in-service, career and education guidance, and/or therapeutic interventions in an educational setting under supervision.

**688R.Academic Internship. (1-3)**

Prerequisite(s): CPSE 678R

Practical experience in a public school setting.

**688R.Internship: Special Education. (1-3)**

Prerequisite(s): CPSE 678R

Practical experience in assessment, teaching, and mentoring in a school setting.

**688R.Internship: School Psychology. (1-3)**

Prerequisite(s): CPSE 678R

Concluding supervised practical experience in assessment, counseling, and interventions in a school setting. Testing, consultation, and other activities of the school psychologist.

**690R.Seminar in Special Education. (0.5-4)**

**693R.Directed Individual Study. (0.5-3)**

Prerequisite(s): Instructor's consent.

**697R.Special Projects. (0.5-6)**

Prerequisite(s): Stat 552 and CPSE 672 or equivalent.

**699R.Master's Thesis. (0.5-6)**

**702.Philosophy and Theories in Counseling Psychology. (3)**

Introduction to counseling psychology. Philosophical assumptions and theoretical perspectives. Integration of science and practice within a consistent philosophical framework.

**710.Ethical/Legal Standards and Issues. (3)**

Ethical and legal standards and issues in the helping professions.

**715.Diagnosis and Treatment of Mental Disorders. (3)**

Diagnosis, classification, and treatment of emotional problems and mental disorders.

**725.Objective and Projective Personality Assessment. (3)**

Prerequisite(s): Instructor's consent.

Objective assessment of personality (including MMPI) as well as projective techniques (including TAT). Pragmatic psychological report writing.

**730.(CPSE - IP&T) Hierarchical Linear Modeling. (3)**

Prerequisite(s): CPSE 651 & CPSE 745

Conceptual and applied processes in hierarchical linear modeling with cross sectional nested data and longitudinal repeated measures data.

**744.Advanced Career Counseling. (3)**

Survey of current research in career psychology. Advanced career counseling techniques focusing on the interface between career and personal issues and the use of assessment.

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### **745.(CPSE - IP&T) Statistics 2: Multiple Regression. (3)**

Prerequisite(s): CPSE 629 & CPSE 651

An examination of multiple regression as an inferential statistical procedure in its own right and as a foundation for subsequent courses in structural equation modeling, path analysis, and factor analysis.

### **746.Supervision and Consultation Theory. (3)**

Theoretical models and approaches to consultation and supervision of counseling; practice in supervising counselors in training.

### **747.(CPSE - IP&T) Structural Equation Modeling. (3)**

Prerequisite(s): CPSE 651 & CPSE 745

Examination of Structural Equation Modeling with expressions in Path Analysis, Confirmatory Factor, and Latent Variable Modeling.

### **748.Advanced Theory of Group Counseling. (3)**

Theory and methods of group counseling; advanced skills in conducting group therapy.

### **750.Research Theory and Methods in Counseling Psychology. (3)**

Prerequisite(s): Admission to PhD program in counseling psychology.

Advanced counseling process and outcome research methods. Includes between groups, within-subjects experimental designs; quasi-experimental and times series designs; discovery-oriented, small N, and qualitative research strategies.

### **751.Counseling Multicultural and Diverse Populations. (3)**

Multicultural competency training on issues of race, ethnicity, gender, sexual orientation, age, socioeconomic status, disability, and religion. Knowledge, skills, and awareness applied to counseling.

### **753R.(CPSE - IP&T) Qualitative Research 2 (Advanced). (3)**

Prerequisite(s): CPSE 653

An in-depth exploration of qualitative research approaches and data analyses. Options include AR/PAR/Self-Study/Narratives; Hermeneutics, Phenomenology; Ethnography/Case Study; Grounded Theory; emerging methods.

### **776R.Advanced Practicum 1: Counseling Psychology. (0.5-3)**

Prerequisite(s): Admission to graduate study in counseling psychology.

Clinical experiences conducted primarily through collaboration with BYU's Counseling and Career Center and focusing on career and educational counseling.

### **777R.Advanced Practicum 2: Counseling Psychology. (0.5-3)**

Prerequisite(s): Admission to graduate study in counseling psychology.

Clinical experiences and psychotherapeutic training conducted primarily through collaboration with BYU's Counseling and Career Center.

### **778R.Counseling Psychology Clerkship. (1-3)**

Prerequisite(s): Admittance into doctoral program in counseling psychology.

Clinical experiences and psychotherapeutic training conducted off campus in an approved community agency clinical setting.

### **779R.University Teaching Practicum. (3)**

Prerequisite(s): Admission to graduate study in counseling psychology.

University teaching under supervision of a faculty member, including teaching or team teaching an undergraduate course and/or team teaching a master's level course (or portions of courses).

### **788R.Predoctoral Counseling Psychology Internship. (1-9)**

Prerequisite(s): CPSE 779R; All other course work, and comprehensive examinations.

One calendar year of full-time or two years of half-time supervised clinical counseling and psychotherapy for a total of 2,000 clock hours.

### **789.(CPSE- IP&T) Meta Analysis. (3)**

Prerequisite(s): CPSE 629 & CPSE 651

An overview of qualitative research synthesis, methods for systematic literature reviews and meta-analysis. A balanced approach between conceptualization and application with practice using existing data sets and statistical packages.

### **790R.Advanced Seminar. (0.5-3)**

Prerequisite(s): Admission to graduate work.

### **799R.Doctoral Dissertation. (0.5-9)**

Prerequisite(s): Completion of skill requirements.

Formal report and defense of substantive research topic designed to make an original contribution to knowledge in the field.

## **FACULTY**

**Allen, G.E. Kawika** *Assistant*

*Professor, PhD, University of Missouri Columbia, 2011.*

*Multicultural Psychology; Polynesian Americans; Spirituality*

**Ashbaker, Betty Y.** *Associate Professor,*

*PhD, Brigham Young University, 1982. Paraeducation; Team*

*Teaching; Legal Issues*

**Beecher, Mark E.** *Clinical*

*Professor, PhD, Brigham Young University, 1998. Individual*

*and Group Psychotherapy; Disabilities; Psychological and Psychoeducational Assessment*



**Caldarella, Paul** *Associate Professor*, PhD, Utah State University, 1998. Social Skills; Behavioral Assessment and Intervention

**Dyches, Tina T.** *Professor*, EdD, Illinois State University, 1995. Severe Disabilities, Family Adaptation to Disability

**Fischer, Lane** *Associate Professor*, PhD, University of Minnesota, 1991. Counseling; School Psychology

**Gabrielsen, Terisa** *Assistant Professor*, PhD, University of Utah, 2012. Autism; ADHD; Interdisciplinary Treatment and Support; Gifted and Talented

**Gibb, Gordon S.** *Associate Professor*, PhD, University of Utah, 1994. Mild/Moderate Disabilities

**Gleave, Robert L.** *Clinical Professor*, PhD, Brigham Young University, 1981. Postmodern Thought; Group Work and Research

**Griner, Derek** *Assistant Clinical Professor*, PhD, Brigham Young University, 2008. Multicultural Psychology, Disability Services

**Hansen, Blake** *Assistant Professor*, PhD, University of Kansas, 2010. Behavioral Analysis and Severe Disabilities

**Heath, Melissa Allen** *Associate Professor*, PhD, Texas A&M University, 1996. Conflict and Violence; Crisis Management, Parent Training

**Jackson, Aaron P.** *Associate Professor*, PhD, University of Missouri, Columbia, 1993. Career Development of Native Americans; Counseling Philosophy and Theories

**Kellems, Ryan** *Assistant Professor*, PhD, University of Kansas, 2011. Transition; Video Modeling; Autism; Secondary Special Education

**Knestel, Andrea** *Assistant Clinical Professor*, PhD, Syracuse University, 2010. Health Psychology; Religiosity

**Prater, Mary Anne** *Professor*, PhD, Utah State University, 1987. Mild/Moderate Disabilities; Multicultural Special Education

**Richards, P. Scott** *Professor*, PhD, University of Minnesota, 1988. Religion and Mental Health; Spirituality and Psychotherapy; Research Methods

**Scharman, Janet S.** *Associate Clinical Professor*, PhD, University of Utah, 1992. School Counseling; Individual and Group Counseling; Qualitative Research Methods; Student Development

**Smith, Timothy B.** *Professor*, PhD, Utah State University, 1997. Moral Issues; Spirituality; Quality Relationships; Family

**Worthen, Vaughn E.** *Clinical Professor*, PhD, University of Kansas, 1993. Career Counseling; Positive Psychology; Supervision

**Young, Ellie L.** *Associate Professor*, PhD, University of South Florida, 2001. Gender Issues in Education; Self-Concept

**Young, K. Richard** *Professor*, PhD, University of Utah, 1973. Educational Psychology; Emotional/Behavioral Disorders; At-Risk Youth and Dysfunctional Families

## EDUCATIONAL INQUIRY, MEASUREMENT AND EVALUATION (PROGRAM)

**Graduate Coordinator:** Sudweeks, Richard R.

150-M MCKB, Provo, UT 84602-5095  
(801) 422-7078

[richard\\_sudweeks@byu.edu](mailto:richard_sudweeks@byu.edu)  
<http://education.byu.edu/eime>

### THE PROGRAMS OF STUDY

This is an inter-departmental PhD program offered by the David O. McKay School of Education. The program is designed to prepare graduates who have the knowledge, expertise, experience, and character traits necessary to work productively as researchers, evaluators, policy analysts, assessment specialists, and/or professors in a variety of settings including (a) universities, (b) federal, state, and local education agencies, (c) private research and evaluation firms, and (d) testing companies.

### *Educational Inquiry, Measurement and Evaluation - PhD*

Students are expected to complete 71 credit hours in the following categories:

- Required courses (21 credit hours): EdLF 650, 775; EdLF 646, IP&T 656, or CPSE 690R; IP&T 650 or Soc 605; IP&T 682, 752, 761
- Elective methods courses (12 credit hours)

Students are expected to complete a coherent set of at least four elective courses selected from the categories listed below. Unless directed otherwise by their committee, students should complete at least one course in the Designs for Inquiry category plus at least one course in the Qualitative and Quantitative Methods category. Students may enroll for directed individual study on a selected topic in any category in which they have already completed at least one course.

## EDUCATIONAL INQUIRY, MEASUREMENT AND EVALUATION (PROGRAM)

### 1. Foundations of Inquiry in Education

EIME 630; EdLF 755, 655, 658, 622, 722

### 2. Designs for Inquiry (at least one course must be completed in this area)

EIME 720; IP&T 674R; CPSE 673; EdLF 645; TEd 698R

### 3. Qualitative and Quantitative Methods (one course must be completed in this area)

Soc 706R; EdLF 678 or IPT 756; CPSE 749; Stat 611; IP&T 674R

### 4. Educational Measurement and Evaluation

IP&T 654; EdLF 621; IP&T 674R or P Mgt 628

- Content Area Specialty (12 credit hours)

Each student is expected to choose a content area specialty from one of the four options listed below. Students are expected to complete at least four courses within their chosen area of focus including one or two required courses depending on the specialty area selected.

### 1. The Preparation and Development of Educators

Required courses: 6 credit hours including TEd 660 and TEd 601

Elective courses: At least 6 additional credit hours selected from the following

TEd 661, 662, 664, 665, 793R, EdLF 627, 659, 729, 755, 762, 694R

### 2. Language, Literacy, and Communication

Required courses: 6 credit hours including TEd 620 plus either TEd 627 or TEd 633

Elective courses: At least 6 additional credits selected from the following

TEd 603, 622, 623, 748, 740, 742, 743, 748, 793R; ComD 601, 630, 679; EdLF 657, 694R; Ling 641, 660, 672

### 3. Learning and Instruction

Required courses: 6 credit hours including one of these three (CPSE 622, IP&T 620, or TEd 602) plus IP&T 750

Elective courses: At least 6 additional credit hours selected from the following

CPSE 612, 621, 693R; IP&T 520, 564, 664, 692R, 693R

### 4. Social-emotional Development and Intervention

Required course: CPSE 615 (3 credit hours)

Elective courses: At least 9 additional credit hours selected from the following

CPSE 602, 603, 604, 614, 649, 693R; EdLF 614; TEd 604, 661, 793R; MFHD 623, 660

- Seminar (2 credit hours)

Students are expected to enroll in the weekly seminar (EIME 690R) in each fall and winter semester during their first two years in the program. Students earn 0.5 credits per semester.

- Internships (6 credit hours)

After completing their coursework, each student will be expected to participate in two 3-credit internships or apprenticeships selected from EIME 781, 782, 783, 784, 785, or 786. Internship placements will be based on the interests of each student as well as the needs of the sponsoring agency. Applications must be submitted in writing and approved by both the students' graduate advisory committee and the EIME advisory council prior to beginning the experience.

- Dissertation: (EIME 799R: 18 credit hours)

## FINANCIAL ASSISTANCE

Students admitted to this program are required to be enrolled as full-time, resident students. Financial assistance is offered in the form of tuition stipends and research assistantships (20 hours per week).

## COURSE DESCRIPTION

### EIME

#### 630.Philosophical and Psychological Foundations of Inquiry in Education. (3)

The formative ideas in philosophy and psychology used to conduct and evaluate scholarly inquiry in education. Includes basic issues, inquiry methods, and forms of scholarly analysis.

#### 690R.Seminar. (0.5)

Prerequisite(s): Enrollment in the EIME program.

Weekly seminar with EIME faculty and other professionals engaged in conducting research, measurement, evaluation, or policy analysis projects.

#### 693R.Directed Independent Study. (1-3)

Faculty-supervised readings as arranged by student.

#### 720.Design-Based Research Methods in Education. (3)

Principles of formative experimentation in studying developing interventions in natural contexts. Challenges of selecting and integrating inquiry methods, resolving implementation problems, linking programmatic variables to theory, assessing effects, and drawing valid conclusions.

**781.Internship in Educational Research. (3)**

Prerequisite(s): IP&T 682 plus at least three other courses in research methods and statistical analysis.

Mentored, applied experience working on educational research projects for a college, university, government agency, foundation, or private company.

**782.Internship in Educational Measurement and Assessment. (3)**

Prerequisite(s): IP&T 652 & IP&T 752 & IP&T 754

Mentored, applied experience working for a company or government agency that develops tests or administers testing programs. Written reports required.

**783.Internship in Educational Evaluation. (3)**

Prerequisite(s): IP&T 661 & IP&T 761; or EDLF 665 & IP&T 761

Mentored, applied experience working as an evaluator for a college, university, government agency, or private company that conducts evaluations for clients.

**785.University Teaching Apprenticeship. (3)**

Prerequisite(s): Advisor and department chair's consent.

Mentored experience teaching a university course.

**786.Design and Analysis Consulting Apprenticeship. (3)**

Prerequisite(s): IP&T 674R & IP&T 682 & IP&T 745

Mentored, applied experience working as a design and analysis consultant for a university.

**799R.Dissertation. (1-18)**

Prerequisite(s): Successful completion of required course work.

Successfully complete and defend a dissertation.

**FACULTY**

*The EIME program draws graduate faculty from each of the five departments within the McKay School of Education and from other arts and sciences departments at the university.*

**EDUCATIONAL LEADERSHIP AND FOUNDATIONS**

**Chair:** Hilton, Sterling C.

**Graduate Coordinator:** Ferrin, Scott E.

306 MCKB, Provo, UT 84602-5092

(801) 422-4291

[edlfsec@byu.edu](mailto:edlfsec@byu.edu)

<http://education.byu.edu/edlf>

**THE PROGRAMS OF STUDY**

Our vision is to improve life conditions and opportunities for individuals, families, and communities worldwide.

Our mission is to improve the equity and quality of teaching and learning environments throughout the world. We accomplish this mission through the integration of research, teaching, and service to strengthen educational opportunities for all people worldwide. This integrated mission is threefold:

- Explore and expand the knowledge of educational theory, policy, practice, and leadership.
- Foster the growth of educational leaders of faith and character who possess the requisite knowledge, skills, and dispositions.
- Build the capacity of individuals, families, communities, states, and nations to identify and solve education problems.

The Department of Educational Leadership and Foundations currently offers the EdD. and the MEd. in Educational Leadership. Students may be admitted for graduate study on a part- or full-time basis for the MEd. EdD students will be in a cohort, with all coursework offered on a weekend and summer basis.

**Educational Leadership - M.Ed.**

The EDLF Department offers the M.Ed. in Educational Leadership through the School Leadership Program. This program prepares

## EDUCATIONAL LEADERSHIP AND FOUNDATIONS

individuals to be competent, caring and qualified educational leaders who have a compelling sense of purpose for continuous improvement of schools and learning for all students. The program of study is designed to give the student a solid theoretical and practical foundation and provides the knowledge and skills to facilitate, motivate, and lead high levels of learning for all students and teachers. This program facilitates the completion of the State-required administrative internship and can provide recommendation for State administrative licensure. Graduates of the School Leadership Program can serve as leaders in educational institutions, in positions of responsibility, such as principals, directors, and superintendents in public and private organizations.

Students have the choice between a full-time track - the Leadership Preparation Program (LPP) - and a part-time track - the Executive School Leadership (ExSL). The M.Ed. program is designed to be completed in one to two years; however, all work must be completed within five years.

A joint JD/MEd degree program is available.

### Requirements for Degree.

- Credit hours: 37-38
- Leadership for Learning courses: EDLF 601, 602, 627, 629, 668
- Equity and Social Justice courses: EDLF 614, 622, 650
- Leading and Managing School Operations and Resources courses: EDLF 610, 620, 631
- Informed Decision-Making courses: EDLF 676, 677
- Internship, Reflective Seminar, and Project courses: EDLF 688R (Administrative Internship), 635R (Reflective Internship Seminar)
- LPP Track (2 credits)
- ExSL Track (1 credit)
- Study list: to be submitted by end of first semester

- Credit limitations: EdLF 515R or extension credit will not be counted toward a degree program
- Comprehensive examination: required upon completion of course requirements
- Administrative Internship

### Requirements for Minimum Registration.

Following admission to the M.Ed. program, students will be expected to work continuously toward completion of all requirements for the degree. The University requires that students complete at least 6 semester hours of approved program credit during each academic year (September 1 to August 31). Students are permitted five years to complete the M.Ed. degree program and graduate.

### Requirements for Administrative/Supervisory License in Addition to Master's Degree.

To become a school site administrator, and for certain district office positions in Utah, the administrative/supervisory license is required. The administrative/supervisory license, an endorsement to the teaching certificate, requires Level II Teaching License, the completion of the Educational Leadership master's degree (including the completion of the administrative internship), and a successful Administrative Praxis exam score. Students completing all licensure requirements may apply to the Department for a letter of recommendation for licensure to be submitted to the Utah State Office of Education.

### *Educational Leadership - EdD*

The Ed.D. program in Educational Leadership and Foundations provides a fresh and powerful learning environment for mid-career in-service educational leaders. The Educational Doctorate Program at Brigham Young University produces educational leaders with scholarly disposition and skills who genuinely lead, lift, inspire and educate their

colleagues and followers. The program will prepare its students to exhibit the disposition and desire to make educational institutions powerful tools for equipping all students, from all backgrounds, for noble lives as contributing members of the human family. Ed.D. student candidates will attend intensive classes for six weekends each semester, in addition to summer courses.

The program focuses on preparing candidates for the following roles:

- **Collaborative leaders and change agents** for systemic reform, who facilitate best practices, utilize data, and manage the change processes in collaboration with fellow educators and other stakeholders based on a shared vision of learning
- **Data-driven decision makers**, who use and develop appropriate data and technology systems critically and effectively to assess student achievement; evaluate colleagues, staff and programs; and plan and implement accountability and transparency in systems
- **Critical consumers of research**, who apply the lessons of research to student, school/district, or societal improvement
- **Culturally proficient agents for educational equity**, who promote educational equity and culturally sensitive policies and practices, recognizing and valuing differences that improve learning and achievement
- **Proficient leaders in the educational context**, who navigate, respond to, and influence the larger educational policy environment and the political, philosophical, social, economic, legal, and cultural contexts of education

### Requirements for Degree

- Successful completion of coursework consisting of 88 credit hours distributed as (1) up to 36 hours of credit for completion of an appropriate master's or



comparable degree, (2) 40 hours of core disciplinary subject matter coursework, and (3) 12 hours of dissertation credit. The program follows a cohort model with no elective credits.

- Successful completion of a comprehensive examination. Students in the 2011-2013 cohorts have the following two options. Students in the 2014 cohort have the second option:
- 1) paper presentation at a national- or international level academic conference (or petition to present at a local or regional conference)
- 2) 10-page paper showing how every course in the doctoral program has benefited him/or her in their studies.
- Successful completion of dissertation. Students will complete a dissertation that will include the preparation of a submissible article for a peer-reviewed journal.

#### Requirements for Minimum Registration.

Following admission to the Ed.D. program, students will be expected to work continuously toward completion of all requirements for the degree. They will be required to attend all class sessions, and provide a memorandum of understanding from their employer agreeing to their attendance at each session. Three times during the school year, students will be evaluated based on attendance, course work and progress to determine if they can continue in the program.

#### FINANCIAL ASSISTANCE

See department for more information.

**Research Assistantships.** A limited number of research assistantships are available upon application. These assignments involve working with selected faculty members on a ten- to twenty-hour-per-week

basis. Assistantships are given for a one-year period only but may be extended following a review of student performance.

**Scholarships.** Scholarships are available on a limited basis. Students receiving assistantships are not normally given tuition scholarships. Tuition aid is given on the basis of need, and applications should be received in the department by May of each year for consideration for the following summer term and academic school year.

#### RESOURCES AND OPPORTUNITIES

**Computer Laboratory.** Computer terminals in the laboratory provide graduate students direct line access to the university's large mainframe computers, enabling students to use several software programs, such as SPSS, SAS, and NVivo to analyze research data. These terminals also enable students to search out books and other materials in the Harold B. Lee Library. EdD students will also have access to the library facilities at the University of Utah.

**Graduate Student Project and Research Laboratory.** Laboratory space is provided for graduate students who are working with faculty on research, evaluation, and development projects.

**Study Areas.** Graduate study areas are available in the McKay Technology, Education, Computing (TEC) Lab.

*For a more detailed description of the graduate program requirements, go to our website, [education.byu.edu/edlf](http://education.byu.edu/edlf)*

#### COURSE DESCRIPTION

##### EDLF

##### 515R.Topics in Educational Leadership. (0.5-3)

##### 601.Leadership for Learning Communities. (2)

Understanding leadership elements that help schools become high functioning communities of learning.

##### 602.Strategic Leadership for School Improvement. (3)

Theoretical foundations of leadership, organizational theory, strategy, and change. Applying strategic leadership and decision making to effectively align school organizational systems of vision/mission, internal organization, and external environment to facilitate school improvement.

##### 610.Human Resource Administration in Education. (3)

Introduction to human resource management in educational organizations. Emphasizes issues related to working with people, policies, laws, and procedures for sound personnel administration practices, including job analysis, recruitment, selection, professional development, supervision, and performance appraisal.

##### 614.Education of Diverse Populations. (2)

Multicultural issues in educational theory and practice, with special reference to race, ethnicity, gender, and socioeconomic status.

##### 621.Economics of Education. (3)

Main concepts that apply economic thinking to education. Overview of literature on the efficiency and effectiveness of educational policies on education outcomes.

##### 622.The Law and Education. (3)

Evolution of American law and its application to American educational systems. Fundamental sources and principles of the law, the judicial structure, language policy issues, and key court cases affecting education at the state and federal levels.

## EDUCATIONAL LEADERSHIP AND FOUNDATIONS

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### **627.Instructional Leadership 1: Seminar on Principalship Roles. (3)**

Prerequisite(s): EDLF 601

Eight principalship roles in creating and maintaining professional learning communities, including principal as learner, culture builder, advocate, leader, mentor, supervisor, manager, and politician. Also includes role conception, socialization, and innovation.

### **629.Instructional Leadership 2: Supervisor's Role in Improving Teaching and Learning. (3)**

Prerequisite(s): EDLF 601 & EDLF 627

Instructional leadership and school improvement processes in creating and sustaining successful learning communities to improve teaching and learning, including formative instructional supervision, professional development, and action research for school improvement.

### **631.The Curriculum: Theory and Practice. (3)**

Theory and practice of curriculum in its various psychological, social, historical, and philosophical contexts.

### **632R.Administrative Internship. (0.5-3)**

Working with a school administrator as a supervised intern.

### **635R.Reflective Internship Seminar. (0.5-3)**

Reflecting individually and collectively on internship experiences; thinking critically about and relating reflections to school leadership theory and best practices.

### **650.Education Policy. (3)**

Introduction to the economic and social benefits of education and the development, implementation, and evaluation of federal, state, and local education policy. Specific education policy issues include governance, resource allocation, accountability, diversity, and curriculum.

### **655.Social History of American Education. (3)**

Interpretative study of major ideas, values, and practices that influenced development of American education within broader social, political, cultural, and economic context.

### **656.Best Practices in American Education. (2)**

Ideas, organizational arrangements, policies, and practices judged highly effective, especially in the promotion of student learning outcomes. Includes visits to local schools.

### **657.Language, Policy, and Education. (3)**

Comparative policy approaches to language of instruction issues in international and U.S. settings, including fundamental sources of policy, from law to international declarations rights; critical overview of second language acquisition theory.

### **658.Political Aspects of Education. (3)**

Understanding processes and institutions in building support for education; associated issues.

### **659.Contemporary Issues in Educational Leadership. (2)**

Developing problem-solving skills in understanding and resolving educational issues affecting schools.

### **660.Education and Social Change. (3)**

Educational development and a theoretical study of social change. Topics include secularization, industrialization and education, structural differentiation, and the role of the state in social change.

### **661.Education and International Development. (3)**

Fundamentals of international development with exposure to major theorists and development paradigms and to modern-day practice of development by bi-lateral and multilateral aid agencies and non-governmental organizations.

### **662.Comparative and International Development Education. (3)**

Substance and methods of comparative and international development education. How comparisons between systems have implicit in them a theory of comparisons of politics and economics. The role of multilateral aid agencies in influencing the development of schooling.

### **663.Education, Culture, and Economic Development. (3)**

Links between education and various aspects of social and economic development. Topics include human capital formation, the issues of education reform, and rates and return to education in the Third World.

### **665.Evaluation and Assessment of School Programs. (3)**

Nature, purpose, and function of evaluating educational programs.

### **668.Philosophical Foundations of Western Education. (2)**

Major philosophies of education and their influence on educational theory and practice.

### **670R.Seminar in Education. (0.5-3)**

Selected topics and issues in education as announced in the current class schedule.

### **672.Research Methods. (3)**

Prerequisite(s): EDLF 640

Techniques of research in educational settings.

**674. Business Administration and Technology Applications in Education. (2)**

Organizing and managing business affairs in educational institutions. Business and instructional applications of technology in education.

**676. Data-Driven Decision Making 1: Concepts and Processes. (3)**

Identifying problems. Using educational research. Collecting, analyzing, and interpreting data in order to solve problems; to establish fair, collaborative decision-making processes; and to inform continuous school and student improvement.

**677. Data-Driven Decision Making 2: Assessing Outcomes at Multiple Levels. (3)**

Prerequisite(s): EDLF 676

Applying data-driven decision making process to assess outcomes at multiple levels, including student assessment and learning; program and staff evaluation; school performance; community needs and expectations assessment and evaluation.

**678. Qualitative Data Analysis. (3)**

Prerequisite(s): EDLF 646

Integration of qualitative research design and analysis with the use of social science qualitative software (NVIVO).

**686. Professional Negotiations. (2)**

**688R. Master's Internship. (0.5-6)**

Practical experience in state office, local school districts, higher education, and other agencies.

**694R. Independent Study. (0.5-3)**

Prerequisite(s): Departmental consent if more than one registration desired.

Study experience in an area of specialization under direction of a faculty member.

**695R. Independent Research. (0.5-3)**

Prerequisite(s): Instructor's consent; departmental consent if more than one registration desired.

Individual research study or project under the direction of a faculty member.

**698R. Master's Project. (0.5-6)**

Prerequisite(s): Departmental consent.

**699R. Master's Thesis. (0.5-6)**

Prerequisite(s): Committee chair's consent.

**700. Strategic and Organizational Leadership. (3)**

Theory and practice of leadership, organizational behavior, organization theory and strategy in education contexts, emphasizing theory application.

**701. Collaborative Leadership for Change. (3)**

Collaborative leadership theories and practices leading to meaningful change in educational organizations and institutions at the micro through macro levels.

**714. Multicultural Education. (3)**

Multicultural issues in educational theory and practice, with special reference to race, ethnicity, gender, socioeconomic status, and various types of exceptionality.

**721. Economics of Education. (3)**

Main concepts that apply economic thinking to education. Overview of literature on the efficiency and effectiveness of educational policies and practices on education outcomes.

**722. Constitutional Law and Education. (3)**

Impact of Constitution on education in America; cases under constitutional law that have influenced policy and practice in the educational system.

**729. Instructional Leadership and Learning Communities. (3)**

Leading and improving successful teaching and learning through applying theory and practice of instructional leadership in learning communities.

**750. Education Policy and Politics. (3)**

Educational policy at the state and national levels emphasizing political theory, normative and empirical dimensions, and political factors that shape the policy process, legislation, and practice.

**759. Contemporary Issues in Educational Leadership. (3)**

Major issues, theories, and policies affecting education today emphasizing U.S. public education. Students will form overarching visions of the current state of U.S. education.

**762. History of Higher Education. (3)**

Historical review of challenges facing higher educational administration in today's colleges and universities.

**768. Philosophy and History of Western Education. (3)**

Major philosophies of education and their influence on western educational theory and practice.

**776. Inquiry 1. (3)**

Using and developing appropriate data and technology critically and effectively to assess student achievement, evaluate colleagues, staff and programs, and to plan and implement accountability and transparency in systems.

**777. Inquiry 2. (3)**

How the lessons of educational research can be applied to student, school/district, or societal improvement.

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### **788R.Doctoral Internship.** (1-6)

Practical experience in the state office, local school districts, higher education settings, or other agencies.

### **791R.Doctoral Seminar.** (0.5-6)

Prerequisite(s): Departmental consent.

### **795R.Research and Reporting Techniques for Doctoral Dissertation.** (1-3)

Research designs and reporting techniques for planning, conducting, and reporting research for doctoral dissertation.

### **799R.Dissertation.** (0.5-18)

## FACULTY

**Boren, David M.** *Assistant Clinical Professor*, PhD, Brigham Young University, 2010. Educational Administration

**Ferrin, Scott E.** *Professor*, EdD, Harvard University, 1996. School Law; Policy; Politics; Language Policy

**Geo-JaJa, MacLeans A.** *Professor*, PhD, University of Utah, 1986. International Development Education; Global Economic Restructuring; Human Development in Africa; Economics of Education

**Hallam, Pamela** *Associate Professor*, PhD, University of Utah, 2006. Instructional Leadership; Human Resources; Educational Administration

**Hilton, Sterling C.** *Associate Professor*, PhD, Johns Hopkins University, 1996. Longitudinal Data Analysis; Structural Equation Modeling; Statistics Education

**Hite, Julie M.** *Professor*, PhD, University of Utah, 1999. Leadership; Organizational Behavior; Organizational Theory; Strategy and Networks

**Hite, Steven J.** *Professor*, EdD, Harvard University, 1985. Research Theory and Methodology

**Mayes, Clifford T.** *Professor*, PhD, University of Utah, 1997. Cultural Foundations; Sociology of Education; Curriculum Theory

**Randall, E. Vance** *Professor*, PhD, Cornell University, 1989. Educational Administration; Social Philosophy; Education Policy

**Richards, A. LeGrand** *Associate Professor*, PhD, Brigham Young University, 1982. Philosophy; Foundations

## ELECTRICAL AND COMPUTER ENGINEERING

**Chair:** Nelson, Brent

**Graduate Coordinator:** Jeffs, Brian D.

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<http://www.ee.byu.edu>

## THE PROGRAMS OF STUDY

Electrical engineering has its origins in the study and application of electrical phenomena. However, in recent years the field has grown to embrace a diverse range of problems in applied physics and mathematics. The department currently offers advanced study in four broad areas.

- Computer Engineering concentrates on the architecture and implementation of digital logic and computing systems.
- Electromagnetics explores the theory, physical properties, and applications of electromagnetic radiation and includes emphases in optics, remote sensing, numerical computation, and microwave systems.
- Microelectronics and VLSI focuses on the design and fabrication of micro-electronic circuits for digital and analog applications, including device physics, modeling, processing, and fabrication.
- Signals and Systems studies fundamental and applied issues in information processing and includes emphases in communication theory, linear and nonlinear control systems, digital signal processing, and estimation theory.

Specific research activities in these broad areas are described on the department graduate program Web page at <http://www.ee.byu.edu/grad>.

Two degrees are offered through the department: Electrical and Computer Engineering-MS and Electrical and Computer Engineering-PhD.



### ***Electrical and Computer Engineering - PhD***

The engineering PhD student collaborates with a faculty advisor on a topic that may have a lasting influence on theoretical understanding or on professional practice. Although courses on advanced topics in one of the four areas of emphasis are taken, the PhD is primarily a research experience that requires an ability to identify, investigate, formulate, and solve new problems of interest. The results of this exercise are reported in a dissertation and in the research literature. Careers for PhD graduates are characterized by the expectation to act with considerable independence and to assume major responsibilities. The PhD graduate is prepared for a wide range of career choices in industry, government agencies, and academia.

#### **Requirements for Degree.**

- Credit hours (56)
- Required courses: 36 credit hours of graduate course work as specified by the advisory committee; 2 hours of Professional Writing EC En 692, 18 hours of dissertation EC En 799R.
- Study list: submitted during the first semester of graduate study.
- Competency exam: completed in the second semester if entering with an MS degree, or in the third semester if entering with a BS degree
- Qualifying exam: completed by end of third year.
- Advancement to candidacy.
- Dissertation.
- Final oral examination consisting of public presentation of original research described in dissertation.

### ***Electrical and Computer Engineering - MS***

The MS degree concentrates on establishing a sound theoretical foundation and on exposing students to advanced developments. The critical thinking and high level of mathematical and algorithmic facility required by the abstract nature of graduate courses allows the MS graduate to assume responsibility and supervision beyond that normally given a BS engineer. MS students study in one of the four broad areas while pursuing either the thesis or course work option. The MS degree typically takes two years to complete.

The preferred MS degree option within the department is the thesis option. Students pursuing the thesis degree work closely with a faculty adviser and develop the research and design tools necessary to participate in the leading edge developments in the discipline. Students applying for the thesis degree option should indicate their research interests and preferred faculty advisor within the application.

The department also offers a MS course work degree which is only an option for students with extenuating circumstances. Students are not generally admitted into the course work option.

#### **Requirements for Degree**

(Thesis Option)

- Credit hours: 32.
- Required courses: 24 credit hours of graduate course work as specified by the advisory committee; 2 credit hours of Professional Writing EC En 692; 6 credit hours of thesis EC En 699R.
- Study list: submitted during first semester of graduate study.

- Thesis.
- Final oral examination consisting of public presentation of original research described in thesis.

#### **Requirements for Degree**

(Course Work Option)

- Credit hours: 32
- Required courses: 30 credit hours of graduate course work as specified by the advisory committee; 2 credit hours of Professional Writing EC En 692.
- Study list: submitted during first semester of graduate study.

### **FINANCIAL ASSISTANCE**

The department provides several types of financial assistance for graduate students. All applicants in good standing are considered for financial aid, but priority is given to PhD students. More information may be obtained from the department. No special application form is required. The following types of assistance are available:

**Tuition Scholarships.** The department offers a limited number of full- and partial-tuition scholarships. All students applying to the program are automatically considered for tuition scholarships.

**Research Assistantships.** Full-time graduate students in good standing may be awarded research assistantships to assist faculty with externally funded research. Contact individual faculty directly to identify research assistantship opportunities.

**Teaching Assistantships.** The department employs graduate students as teaching assistants in undergraduate and graduate courses. The department also employs

## ELECTRICAL AND COMPUTER ENGINEERING

students in a number of department support positions such as computer system administration and laboratory support. Applications for teaching assistant and department student positions are accepted the week prior to the given semester or term. Contact the department for more information about current teaching assistant and department support opportunities.

### RESOURCES AND OPPORTUNITIES

The department maintains a variety of facilities to support the diverse research efforts of the graduate faculty. Facilities include:

- Extensive PC and Unix workstation computer resources.
- Digital signal processing laboratory that includes a variety of software tools, image display and digitizing equipment, and audio processing equipment.
- Well-equipped clean-room to support research in semiconductor and electro-optic fabrication.
- Microwave remote sensing and integrated systems laboratories.
- Electro-optics laboratory that includes lasers and fiber optic research equipment.
- Antenna range.
- Reconfigurable logic laboratory.
- Telemetry laboratory to support research in digital communications and error control coding.
- Laboratory to support research in cooperative and autonomous systems.
- Facilities for medical imaging research.
- Laboratories to support research on chemical and biological systems.

*For a description of current research activities associated with each facility, see the department graduate program Web page at <http://www.ee.byu.edu/grad>.*

### COURSE DESCRIPTION

#### EC EN

##### **521.Introduction to Algorithm Design. (3)**

Prerequisite(s): C S 235 and 236 and EC En 324; or equivalents.

Algorithm analysis, data structures, sorting and searching, graph traversal, weighted graph algorithms, combinational search and heuristic methods, dynamic programming, approximation algorithms, designing algorithms.

##### **522R.Special Topics in Computer Systems. (0.5-3)**

Prerequisite(s): Instructor's consent.

##### **523.Computer System Reliability. (3)**

Prerequisite(s): EC En 320, 324, 370.

Analysis, modeling, and design of reliable, fault-tolerant computing systems.

##### **528.Computer Architecture. (3)**

Prerequisite(s): EC En 424 or equivalent.

Architectural analysis and design of computer systems: instruction-level parallelism, memory hierarchy, instruction sets, low-power architecture.

##### **541.Active and Passive Filter Design. (3)**

Prerequisite(s): ECEn 340, 380; or equivalents.

Design methods for electronic filters based on passive components, active components, and integrated circuit components.

##### **542R.Special Topics in Electronics. (0.5-3)**

Prerequisite(s): Instructor's consent.

##### **43.CMOS Amplifier Design. (3)**

Prerequisite(s): ECEn 443 or 445 or equivalent.

Factors affecting performance of MOS devices in analog applications. Design of MOS amplifiers, buffers, and comparators.

##### **548.Analog CMOS Circuit Design. (3)**

Prerequisite(s): ECEn 443 or 445 or equivalent.

Design of CMOS comparators, wideband amplifiers, bandgap references; multipliers, PTAT generators, charge-transfer amplifiers, chopper-stabilized amplifiers, and advanced D/A and A/D CMOS architectures.

##### **549.VLSI Communication Circuit Design. (3)**

Prerequisite(s): ECEn 443 or 445 or equivalent.

Frequency synthesizers; low-jitter, voltage-controlled oscillators; high Q circuits; clock regeneration; phase-locked loops; frequency discriminators; and radio-on-a-chip concepts.

##### **550.(EC En-Me En) Microelectromechanical Systems (MEMS). (3)**

Prerequisite(s): EC En 450 or Me En 372 or equivalent.

Design, fabrication, and applications of MEMS. Mechanical properties governing their design and reliability and the processing technologies used to fabricate them.

##### **555.Optoelectronic Devices. (3)**

Prerequisite(s): ECEn 450 or equivalent or instructor's consent.

Design, operation, and fabrication of modern optoelectronic devices, including photodiodes, photovoltaics, LEDs, and lasers.

**560. Electromagnetic Wave Theory. (3)**

Prerequisite(s): EC En 462 or equivalent.

Principles and methods of modern electromagnetic wave theory: anisotropic media, dyadic green functions, Huygen's principle, contour integration methods, asymptotic integration. Applications in radiation and scattering.

**562. Optical Communication Components and Systems. (3)**

Prerequisite(s): EC En 462, 466; or equivalents.

Fiber-optic communication system components and their operating and performance characteristics.

**563. Applied Computational Electromagnetics. (3)**

Prerequisite(s): EC En 462 or equivalent.

Current theory and practice in numerically solving Maxwell's equations for antenna and circuit design and radar-scattering prediction.

**564. Radar and Communication Systems. (3)**

Prerequisite(s): EC En 464 or 485; EC En 360 or 462; or instructor's consent.

Design and performance of radar and communication systems: radar equation ambiguity functions, modulation, signal detection, link budgets, spread spectrum, system design, and performance trade-offs.

**568. Microwave Remote Sensing. (3)**

Prerequisite(s): Instructor's consent.

Emphasis on space-borne remote sensing of the earth's atmosphere, land, and oceans. Primary methods and applications for both active (radar) and passive (radiometry).

**576. Medical Imaging and Image Reconstruction. (3)**

Prerequisite(s): EC EN 360 & EC EN 370 & EC EN 380

Fundamentals of medical imaging modalities (x-ray, CT, ultrasound, and MRI) from a signals and systems perspective, magnetic resonance physics, medical image reconstruction methods (backprojection, partial-Fourier techniques, parallel imaging, compressed sensing).

**620. Advanced Digital Systems. (3)**

Prerequisite(s): EC En 320 or proficiency in HDL digital system design.

Advanced synchronous systems design; CAD and HDLs; systolic arrays; high-speed, low-power digital circuit architectures.

**621. Computer Arithmetic. (3)**

Fundamental principles and development of algorithms for performing arithmetic on digital computers and application-specific processors.

**625. Compilation Strategies for High-Performance Systems. (3)**

Prerequisite(s): EC En 320 and 521.

Compilation and synthesis strategies for high-performance hardware/software systems.

**627. Advanced Embedded Systems. (3)**

Prerequisite(s): ECEn 425 or 427 or equivalent.

Topics include embedded system architecture and organization, hardware-software codesign, hardware-software partitioning, co-verification, system-on-a-chip, and real-time systems.

**629. Reconfigurable Computing Systems. (3)**

Prerequisite(s): EC En 521; EC En 320 (or proficiency in HDL digital system design).

Introduction to FPGA devices, lab experience developing FPGA-based configurable systems.

**631. Robotic Vision. (3)**

Prerequisite(s): ECEn 380, Math 313 (or equivalents); proficiency in Matlab or C++.

Deriving 3-D geometry and motion from image sequence or multiple digital images: camera modeling, image processing techniques, and geometry models of single and multiple-view systems.

**648. Advanced Mixed-Signal Circuit Design. (3)**

Prerequisite(s): EC En 548.

New converter architectures, advanced measurement and characterization techniques, low-noise timing circuits, VLSI layout and package considerations, bond wire inductance, and wireless applications.

**654. VLSI Systems Design. (3)**

Prerequisite(s): EC En 451 or equivalent.

Design of structured circuit systems for very large-scale integrated semiconductor chips. Architecture of digital VLSI systems.

**661. Advanced Optical Engineering. (3)**

Prerequisite(s): ECEn 462 or equivalent.

Theory and analysis of optical systems, including beam propagation, image formation, and modern optical systems.

**662R. Special Topics in Electromagnetics. (0.5-3)**

Prerequisite(s): Graduate standing or instructor's consent.

**665. Antennas and Propagation for Wireless Communication. (3)**

Prerequisite(s): EC En 380, 462; or equivalents.

Antenna analysis, array theory, and propagation channel models with application to wireless communication systems.

## ELECTRICAL AND COMPUTER ENGINEERING

### **670.Stochastic Processes. (3)**

Prerequisite(s): EC En 370 and 380 or equivalents; graduate standing or instructor's consent.

Review of elementary probability, introduction to random processes: definitions, properties, covariance, spectral density, time average, stationarity, ergodicity, linear system relations, mean square estimation, Markov processes.

### **671.Mathematics of Signals and Systems. (3)**

Prerequisite(s): ECEn 380, Math 313 (or equivalents); graduate standing or instructor's consent.

Introduction to mathematics of signal processing, communication, and control theory; linear spaces, Eigenvalue and singular-value decompositions, quadratic forms, linear operators, adjoints, dual spaces.

### **672.Detection and Estimation Theory. (3)**

Prerequisite(s): EC En 370 or equivalent; EC En 670; graduate standing or instructor's consent.

Sufficiency, completeness; Neyman-Pearson and Bayes detector; maximum likelihood, Bayes, minimum mean square, and linear estimation; Kalman filters; selected topics.

### **673.(EC En-Me En 633) Digital Control Systems. (3)**

Prerequisite(s): EC En 483 or Me En 431 or equivalent.

Design of digital controllers for dynamical systems, analysis using the z-transform, digital filter implementation, application of transform-based classical design methods, and modern state-space techniques.

### **674.EC En-Me En 634) Flight Dynamics and Control. (3)**

Prerequisite(s): EC En 483 or Me En 431 or equivalent.

Dynamics of flight, stability, and control derivatives, longitudinal and lateral control design, state-space control strategies for aircraft; and unmanned air vehicle applications.

### **678.Digital Image Processing. (3)**

Prerequisite(s): EC En 487 or equivalent; graduate standing or instructor's consent.

Digital processing theory and techniques for two-dimensional image analysis, enhancement, restoration, data compression, and reconstruction from projections.

### **682R.Special Topics in Signals and Systems. (0.5-3)**

Prerequisite(s): Graduate standing or instructor's consent.

### **689R.Advanced Topics in Signals and Systems. (3)**

Subjects that may be offered include: information theory, optimal estimation theory, system identification, advanced image processing, pattern recognition

### **692.Professional Writing for Electrical and Computer Engineers. (2)**

Advanced writing concepts. Organizing, writing, and publishing scholarly research.

### **699R.Master's Thesis. (0.5-9)**

Prerequisite(s): Graduate standing and major professor's consent.

### **770.Information Theory. (3)**

Prerequisite(s): EC En 370 or equivalent.

Mathematical development of information theory applied to data communications and coding. Topics include entropy, mutual information, channel capacity, data compression, rate distortion theory, etc.

### **773.(EC En-Me En 733) Linear System Theory. (3)**

Prerequisite(s): EC En 483 or Me En 431 or equivalent; EC En 671.

Mathematical introduction to time-varying linear systems; state space descriptions, controllability, observability, Lyapunov stability, observer-based control. Design of linear quadratic regulators and infinite-horizon Kalman filters.

### **774.(EC En-Me En734) Nonlinear System Theory. (3)**

Prerequisite(s): EC En 483 or Me En 431 or equivalent; EC En 671.

Mathematical introduction to nonlinear dynamic systems. Topics include Lyapunov methods, passivity, input-output stability, and nonlinear feedback design.

### **775.Error-Control Coding. (3)**

Prerequisite(s): Graduate standing or instructor's consent.

Theory and implementation of block and convolutional codes for error control in digital communication systems. Iterative detection of low-density parity-check codes and turbo codes.

### **776.Advanced Digital and Wireless Communications. (3)**

Prerequisite(s): EC En 485 or equivalent; EC En 670.

Linear and nonlinear M-ary modulation and detection, system performance in AWGN and multipath fading environments, equalization, synchronization, spread spectrum.

### **777.Digital Signal Processing. (3)**

Prerequisite(s): EC En 487 or equivalent; EC En 670, 671; graduate standing or instructor's consent.

Advanced theory and applications including optimal statistical processing, adaptive processing, and array processing methods.

### **799R.Doctoral Dissertation. (0.5-9)**

## FACULTY

**Archibald, James K.** *Professor*, PhD, University of Washington, 1987. Multi-agent Systems; Computer Vision; Real-time Systems

**Bangerter, Neal K.** *Associate Professor*, PhD, Stanford University, 2004. Biomedical Imaging; Magnetic Resonance Physics and Devices; Digital Image Processing



**Beard, Randal W.** *Professor*, PhD, Rensselaer Polytechnic Institute, 1995. Guidance and Control of Micro Air Vehicles; Cooperative Control; Nonlinear Control Theory

**Comer, David J.** *Professor*, PhD, Washington State University, 1966. Electronics; Circuit Theory; Analog Integrated Circuits

**Hawkins, Aaron R.** *Professor*, PhD, University of California, Santa Barbara, 1998. Solid-State Device Physics; Semiconductor Processing; Optoelectronics and Photonics; Materials Integration

**Hutchings, Brad L.** *Professor*, PhD, University of Utah, 1992. Reconfigurable Logic; FPGA's VLSI Design

**Jeffs, Brian D.** *Professor*, PhD, University of Southern California, 1989. Signal Processing; Radio Astronomy

**Jensen, Michael A.** *Professor*, PhD, University of California, Los Angeles, 1994. Wireless Communications; High-Frequency Circuits; Antennas and Propagation

**Lee, D. J.** *Professor*, PhD, Texas Tech University, 1990. Medical Imaging and Informatics, Machine Vision Applications, and Real-Time Robot Vision

**Long, David G.** *Professor*, PhD, University of Southern California, 1989. Microwave Remote Sensing; Estimation Theory; Radar

**Mazzeo, Brian A.** *Assistant Professor*, PhD, University of Cambridge, 2008. Semiconductor Modeling; Biosensors; Dielectric Spectroscopy

**Nelson, Brent E.** *Professor*, PhD, University of Utah, 1984. Digital Systems Design and CAD Tools, FPGA's and FPGA-based configurable computing, VLSI design and CAD tools

**Nordin, Gregory P.** *Professor*, PhD, University of Southern California, 1992. Photonics; Sensors; Nano-Structures

**Penry, David A.** *Associate Professor*, PhD, Princeton University, 2006. Computer Architecture; Microarchitecture; Simulation; VLSI Design

**Rice, Michael** *Professor*, PhD, Georgia Institute of Technology, 1991. Digital Communication Theory; Error-Control Coding; Software Radios

**Schultz, Stephen M.** *Associate Professor*, PhD, Georgia Institute of Technology, 1999. Fiber Optics; Integrated Optics; Diffractive Optics

**Selfridge, Richard H.** *Professor*, PhD, University of California, Davis, 1984. Fiber and Integrated Optics; Electromagnetics; Lasers

**Stirling, Wynn C.** *Professor*, PhD, Stanford University, 1983. Linear System Theory; Estimation and Detection Theory; Control Theory

**Warnick, Karl** *Professor*, PhD, Brigham Young University, 1997. Microwave Systems; Antenna Design; Electromagnetic Theory; Numerical Methods

**Wilde, Doran** *Associate Professor*, PhD, Oregon State University, 1995. Regular Array Architectures, Computer Arithmetic, Autonomous Vehicles

**Wirthlin, Michael J.** *Professor*, PhD, Brigham Young University, 1997. Reconfigurable Computing; Fault-Tolerant FPGA Processing; High-Level Synthesis and Compilation

## ENGLISH

**Chair:** Snyder, Phillip A.  
**Graduate Coordinator:** Eastley, Aaron

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<http://english.byu.edu>

## THE PROGRAMS OF STUDY

The English Department, as a part of the College of Humanities, offers graduate study devoted to the development of reading, writing, and thinking abilities derived from studying and producing literary and other texts in English. Students study these works in aesthetic, historical, religious, and other contexts, including the theoretical contexts the faculty members bring to the courses they teach. This program makes intensive use of the library and its resources.

The MA in English program enables students to develop knowledge, skills, and attitudes that have application in contemporary society and that are in harmony with the principles of the restored gospel of Jesus Christ.

The program may appeal to students who plan to enter such careers as teaching, editing, and writing; to those who seek an advanced liberal arts degree for preparation in library science or public service; to those who plan to go on for a doctorate in English or a related area; and to those who wish to continue studies for personal satisfaction.

The MFA in Creative Writing likewise prepares students as scholars and creative writers for careers in teaching and writing. While the MFA in Creative Writing is widely considered a terminal degree, it can also qualify students interested in additional training for a Ph.D. in Creative Writing.

## ENGLISH

Each year, around 30 students are admitted to graduate study in our department, with approximately 20 students entering our MA in English program and approximately 10 entering our MFA in Creative Writing program. The average duration for both degree programs is two years.

### **Creative Writing - MFA**

#### **Requirements for Degree - MFA in Creative Writing**

- Credit hours: 32 minimum, consisting of 26 course work hours plus 6 thesis hours (Engl 699R).
- Introductory course (2 hours): Eng 600.
- Required courses (18 hours): Three graduate-level writing workshops; two literature courses, and English 617 (617 should be taken in the first year)
- Elective courses (6 hours): Two graduate-level courses in the English Department (up to three credit hours may be taken outside the English Department with advisor approval)
- Thesis: six thesis hours (Engl 699R)
- Oral examination of thesis, coursework, and reading list.

### **English - MA**

- Credit hours: 32 minimum, consisting of 26 course work hours plus 6 thesis hours (Engl 699R)
- Introductory course (2 hours): Engl 600
- Required course in theory (3 hours): Depending on the student's approved course of study, Engl 613R, Engl 616, Engl 617R, or Engl 630R fulfill this requirement.
- Other courses (21 hours): Seven graduate-level courses in English (up to three credit hours may be taken outside the English Department with advisor approval)

- Thesis (6 hours): six hours of Engl 699R thesis hours credit
- Oral examination of thesis, coursework, and reading list

### **FINANCIAL ASSISTANCE**

Financial assistance is available for this program through the English Department and other agencies in the university. The English Department offers tuition awards for all first- and second-year students.

Admitted students are encouraged to apply for instructorships, teaching and research assistantships, editing internships, and other awards that are provided as a financial and learning resource. The university handles federal student loans.

### **RESOURCES AND OPPORTUNITIES**

The Department of English utilizes the **Office of Digital Humanities**. This center is especially active in the production of teaching and research materials, particularly those that are computer related.

**The Office for the Study of Christian Values in Literature** was established in 1980 to affirm the importance of religious and moral values in the creation and study of imaginative literature. It provides both a focus for activity and an encouragement to teachers, writers, scholars, and readers who believe in a value-centered literary tradition.

**The Writing Center** is available to assist students and faculty in improving their writing skills. Graduate students benefit particularly from critical evaluations of drafts of seminar papers and theses, and those with advanced writing skills may serve as interns in the center.

Faculty research interests are included in the faculty section following the course descriptions.

*For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin.*

## **COURSE DESCRIPTION**

### **ENGL**

**516.Advanced Technical Writing.** (3)  
Prerequisite(s): Engl 316 or instructor's consent.

Advanced concepts, including literature of technical writing, liaison with technical staff, communication networks, rhetoric of graphics, and teaching and freelancing technical writing.

**520R.Studies in Theme and Form.** (0.5-3)

Topics vary: literature and film, myth and archetype, science fiction, etc.

**590R.Directed Readings.** (1-3)

Prerequisite(s): Graduate advisory committee approval.

Individual readings beyond what is offered in the curriculum.

**599R.Academic Internship.** (0.5-9)

Prerequisite(s): Department chair's consent.

On-the-job training.

**600.Introduction to Graduate Studies.** (2)

Trends in postgraduate curricula, ideology, pedagogy, and professional publication in language and literature.

**610.Composition Pedagogy.** (3)

Prerequisite(s): Composition program approval.

Practicum for graduate students teaching First-Year Writing courses.

**611R.Studies in Teaching Advanced Composition.** (3)

Prerequisite(s): Composition program approval.

Practicum for graduate students training to teach advanced composition courses.

**612R.History of Rhetoric. (3)**

Major texts, thinkers, and movements of the Western rhetorical tradition from classical antiquity to the present.

**613R.Rhetorical Theory and Criticism. (3)**

Interpreting and evaluating rhetorical acts and artifacts, including literature, for the purpose of understanding rhetorical theory and practice.

**614R.Special Topics in Rhetoric and Composition. (3)**

Various approaches to rhetoric and composition.

**615R.Special Topics in Technical and Professional Communication. (3)**

Various approaches to technical and professional communication.

**616R.Research in Rhetoric and Composition. (3)**

Research methods in rhetoric and composition; evaluation of assumptions, strengths, and limitations of each method; identification of student research topics.

**617R.Creative Writing Theory. (3)**

Theories and techniques of creative writers, primarily in fiction, poetry, and creative nonfiction.

**620R.Seminar in British Literature before 1660. (3)**

Texts, trends, and writers from the medieval and early modern periods.

**621R.Seminar in British Literature 1660-1830. (3)**

Texts, trends, and writers from the Restoration, the eighteenth century, and the Romantic period.

**622R.Seminar in British Literature 1830-Present. (3)**

Texts, trends, and writers from the Victorian, modern, and postmodern periods.

**623R.Seminar in the Novel. (3)**

Various approaches to the novel.

**624R.Seminar in Drama. (3)**

Various approaches to drama.

**626R.Seminar in American Literature before 1865. (3)**

Texts, trends, and writers from the colonial, Revolutionary, early national, and Romantic periods.

**627R.Seminar in American Literature 1865-1914. (3)**

Texts, trends, and writers from the realistic and naturalistic periods.

**628R.Seminar in American Literature 1914-Present. (3)**

Texts, trends, and writers from the modern and postmodern eras.

**629R.Seminar in Transnational Literature. (3)**

Texts, trends, and writers from a variety of national and ethnic literary traditions.

**630R.Theoretical Discourse. (3)**

Prerequisite(s): Engl 451 or 452 or equivalent.

Major texts, issues, and debates from the history of literary theory.

**640R.Studies in Folklore. (3)**

Prerequisite(s): Engl 391 or instructor's consent.

Directed study of folklore and folkways.

**667R.Creative Nonfiction Workshop. (3)**

Prerequisite(s): Engl 317R or 318R; Engl 419R; or instructor's consent.

Writing creative nonfiction. Individual consideration of manuscripts.

**668R.Fiction Workshop. (3)**

Prerequisite(s): Engl 318R or 319R; Engl 419R; or instructor's consent

Writing fiction. Individual consideration of manuscripts.

**669R.Poetry Workshop. (3)**

Prerequisite(s): Engl 319R, 419R; or instructor's consent.

Writing poetry. Individual consideration of manuscripts.

**670R.Youth Adult Novel Workshop. (3)**

Prerequisite(s): Engl 320R, 419R; or instructor's consent.

Writing for young adult readers. Individual consideration of manuscripts.

**699R.Master's Thesis. (0.5-18)**

**FACULTY**

**Bennion, John S.** *Associate Professor*, PhD, University of Houston, 1989. Creative Writing; British Novel; Mormon Literature

**Boswell, Grant M.** *Associate Professor*, PhD, University of Southern California, 1985. Rhetorical Theory and History; Composition Theory

**Burton, Gideon O.** *Assistant Professor*, PhD, University of Southern California, 1994. History of Rhetoric; Renaissance Literature; Mormon Criticism and Literature

**Christiansen, Nancy L.** *Associate Professor*, PhD, University of California, Los Angeles, 1994. History and Theory of Rhetoric; Sixteenth-Century English Literature

**Christianson, Frank** *Associate Professor*, PhD, Brown University, 2004. Twentieth-Century American and Trans-Atlantic Literature

**Clark, Gregory D.** *Professor*, PhD, Rensselaer Polytechnic Institute, 1985. Rhetorical Theory and Criticism; Early American Literature

## ENGLISH

- Coombs, Dawan Lynn** *Assistant Professor*, PhD, University of Georgia, 2012. Reading Pedagogy; English Education
- Crisler, Jesse S.** *Professor*, PhD, University of South Carolina, 1973. Nineteenth-Century American Literature; Naturalism; Adolescent Literature
- Crowe, Christopher E.** *Professor*, EdD, Arizona State University, 1986. English Education; Adolescent Literature
- Cutchins, Dennis R.** *Associate Professor*, PhD, Florida State University, 1997. American Literature; Folklore
- Cutler, Edward S.** *Associate Professor*, PhD, University of California, San Diego, 1997. Nineteenth-Century American Literature
- Dean, Deborah M.** *Professor*, PhD, Seattle Pacific University, 1999. English Education; Writing Pedagogy
- Duerden, Richard Y.** *Associate Professor*, PhD, University of Chicago, 1989. Sixteenth- and Seventeenth-Century English Literature; Literary Theory
- Eastley, Aaron** *Associate Professor*, PhD, University of California, San Diego, 2003. Twentieth-Century and Postcolonial British Literature
- Eliason, Eric A.** *Professor*, PhD, University of Texas, Austin, 1998. Folklore
- Esplin, Emron** *Assistant Professor*, PhD, Michigan State University, 2008. 19th and 20th Century American Literature; 20th Century Latin American Literature
- Eyring, Mary** *Assistant Professor*, PhD, University of California, San Diego, 2012. Early American Literature; American Women's Writing and Cultural Productions of the 19th Century; Transatlantic Literature and Print Culture; Disability Studies
- Franklin, Joseph C.** *Assistant Professor*, PhD, Texas Tech University, 2012. Creative Writing and 20th Century American Regionalism
- Grierson, Sirpa T.** *Associate Professor*, PhD, University of Southern Mississippi, 1996. English Education; Reading and Educational Research
- Hall, William** *Assistant Professor*, PhD, University of California at Santa Barbara, 2010. 18th Century Poetry, Digital Humanities
- Hansen, Kristine** *Professor*, PhD, University of Texas, Austin, 1987. Rhetoric; Composition Theory
- Hickman, Trenton L.** *Associate Professor*, PhD, State University of New York, Stony Brook, 2000. Twentieth-Century American Literature; Latino Literature; Anglophone Caribbean Literature
- Horrocks, Jamie** *Assistant Professor*, PhD, Indiana University, 2010. Womens Studies, Victorian-Modernist Era British Literature
- Jackson, Brian D.** *Associate Professor*, PhD, University of Arizona, 2007. Rhetoric; Composition; Teaching of English
- Johnson, Kim** *Professor*, PhD, University of California, Berkeley, 2003. Poetry; Renaissance Literature
- Larsen, Lance E.** *Professor*, PhD, University of Houston, 1993. Creative Writing; American Literature; Contemporary Poetry
- Lawrence, A. Keith** *Associate Professor*, PhD, University of Southern California, 1987. Early American Literature; Asian-American Literature
- Leman, Peter D.** *Assistant Professor*, PhD, UC Irvine, 2011. African Literature, Post-Colonial Literature, Law and Literature
- Madden, Patrick** *Associate Professor*, PhD, Ohio University, 2004. Creative Writing; Nonfiction
- Mason, Nicholas A.** *Professor*, PhD, State University of New York at Stony Brook, 1999. Eighteenth- and Nineteenth-Century British Literature
- Matthews, Kristin** *Associate Professor*, PhD, University of Wisconsin, Madison, 2004. Contemporary American and Cold War Literature
- McInelly, Brett C.** *Associate Professor*, PhD, University of Cincinnati, 2000. British Novel; Postcolonial Theory; Composition Studies
- Muhlestein, Daniel K.** *Assistant Professor*, PhD, Rice University, 1992. Literary Theory; English Romantic Literature
- Ostenson, Jonathan** *Assistant Professor*, PhD, University of Utah, 2010. English Education
- Paul, Danette** *Associate Professor*, PhD, Pennsylvania State University, 1996. Rhetoric and Composition; Rhetoric of Science



**Perry, Dennis R.** *Associate Professor*, PhD, University of Wisconsin, Madison, 1986. Early American Literature; Cinema Studies; Poe Studies

**Petersen, Zina N.** *Associate Professor*, PhD, Catholic University, 1997. Medieval English Studies; Women's Devotional Literature

**Roberts, Brian R.** *Assistant Professor*, PhD, University of Virginia, 2008. African American Literature, Late Nineteenth-Century American Literature, American Studies

**Rowan, Jamin** *Assistant Professor*, PhD, Boston College, 2008. Urban Studies, Late Nineteenth and Twentieth-Century American Literature

**Rudy, Jill T.** *Associate Professor*, PhD, Indiana University, 1997. Folklore

**Siegfried, Brandie R.** *Associate Professor*, PhD, Brandeis University, 1993. Sixteenth- and Seventeenth-Century English Literature; Women's Studies; Literary Theory

**Snyder, Phillip A.** *Associate Professor*, PhD, University of North Carolina, Chapel Hill, 1988. Twentieth-Century British and American Literature; Autobiography

**Stock, David** *Assistant Professor*, PhD, University of Wisconsin-Madison, 2012. Rhetoric and Writing Studies, Writing Centers/Writing Across the Curriculum, Histories and Pedagogies of Rhetoric

**Talbot, John C.** *Associate Professor*, PhD, Boston University, 2001. Classics; English Poetry

**Tanner, John S.** *Professor*, PhD, University of California, Berkeley, 1980. Milton; Seventeenth-Century English Literature

**Thorne-Murphy, Leslee** *Associate Professor*, PhD, Brandeis University, 2001. Victorian Literature and Women's Studies

**Thursby, Jacqueline** *Professor*, PhD, Bowling Green State University, 1994. English Education; Folklore

**Tuttle, Stephen B.** *Associate Professor*, PhD, University of Utah, 2006. Creative Writing

**Watts, Jarica** *Assistant Professor*, PhD, University of Utah, 2011. Early 20th Century British Literature, British Modernism

**Westover, Paul** *Assistant Professor*, PhD, Indiana University, 2008. British Romanticism

**Wickman, Matthew F.** *Associate Professor*, PhD, University of California, Los Angeles, 2000. Eighteenth-Century British Literature; Literary Theory

**Wilcox, Miranda** *Assistant Professor*, PhD, Notre Dame University, 2006. Medieval Literature

## EXERCISE SCIENCES

**Department Chair:** Mack, Gary W.  
**Graduate Coordinator:** Myrer, J. William

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(801) 422-2670  
maggie\_shibla@byu.edu  
<http://exercisesciences.byu.edu/>

## THE PROGRAMS OF STUDY

The Department of Exercise Sciences values the human being as sacred and seeks to strengthen both body and spirit by attaining, advancing, and disseminating knowledge in the disciplines of human exercise and performance, injury and rehabilitation, and wellness while inviting divine inspiration to guide our efforts.

Graduate programs within the Department of Exercise Sciences are designed to provide an atmosphere where increased knowledge and practice prepare students to become leaders in their professions, families, communities, and the world. Instruction takes the form of lectures and laboratory courses, seminars, examinations, independent study, research, and teaching experiences.

The Department of Exercise Sciences has the following graduate program objectives:

- To develop scholars, researchers, teachers, and professionals in exercise science who can make significant original contributions to the discipline's body of knowledge and integrate, apply, and disseminate the frontiers of exercise science knowledge.

The following degrees are offered through the Department of Exercise Sciences: Exercise Sciences-MS (thesis required); and Exercise Sciences-PhD.

The Department of Exercise Sciences houses the Human Performance Research Center (HPRC). The primary purpose of the HPRC is to support applied and basic research programs of faculty

## EXERCISE SCIENCES

and graduate students on such topics as nutrition and exercise, drugs and exercise, exercise and cardiovascular disease, exercise and weight control, therapeutic modalities and rehabilitation procedures, biomechanics, and other contemporary issues in exercise science.

### **Exercise Sciences - MS**

Areas of specialization: Exercise Science, Health Promotion, Exercise Physiology, Athletic Training.

#### **Requirements for Degree**

- Credit hours: minimum 30-32, with 24-25 being course work hours, plus 6 thesis hours (ExSc 699R) within the following areas of specialization.

#### *Exercise Sciences*

- Prerequisites: Graduate with a bachelor's degree in Exercise Sciences or a related field, including courses in: Kinesiology/ Biomechanics (ExSc 362), Exercise Physiology (ExSc 463, ExSc 464), Human Anatomy (PDBio 220, ExSc 390 or equivalent), College Physics (Physics 105/107), College Algebra (Math 110), College Chemistry (Chem 105/106/107), Essentials in Human Physiology (PDBio 305) or Advanced Physiology (PDBio 362), Statistics (STAT 121).
- Core courses (13 hours): STAT 511, ExSc 630, 691, 699R (thesis, 6 hours)
- Required courses (14 hours): ExSc 663, 666, 667, 668, 671
- Electives (6 hours): ExSc 560, 625R, 658, 659, 661, 662, 655, 669, 670, 673, 693R, 766, 769, Chem 481, PDBio 565, or other courses as approved by your advisory committee.

#### *Health Promotion*

- Prerequisites: Graduate with a bachelor's degree in Exercise Sciences or a related field, including courses in Human Anatomy (PDBio 220), Essentials

in Human Physiology (PDBio 305), Principles of Statistics (Stat 121), Essentials of Human Nutrition (NDSF 100), Lifestyle and Chronic Disease Prevention (ExSc 387), Stress Management (ExSc 410), Worksite Health Promotion (ExSc 455), Exercise Physiology (ExSc 463), Obesity and Weight Management (ExSc 480).

- Core courses (13 hours): STAT 511, ExSc 630, 691, 699R (thesis, 6 hours)
- Required classes: (19 hours from the following courses): ExSc 688R (3 hours), 640, 661, 666, 667, 669, 671, 673, or other courses as approved by your advisory committee.

#### *Exercise Physiology*

- Prerequisite: Graduate with a bachelor's degree in Exercise Sciences or a related field, including courses in: Kinesiology/ Biomechanics (ExSc 362), Exercise Physiology (ExSc 463, ExSc 464), Philosophical and Ethical Issues in Exercise Sciences (ExSc 302), Problems in Exercise Prescription (ExSc 468), Advanced Musculoskeletal Human Anatomy (ExSc 390), College Physics (Physics 105/107), College Algebra (Math 110), College Chemistry (Chem 105/106/107), Essentials in Human Physiology (PDBio 305) or Advanced Physiology (PDBio 362), Statistics (STAT 121)
- Core Courses (13 hours): STAT 511, ExSc 630, 691, 699R (thesis, 6 hours)
- Required Courses (7 hours): ExSc 666, 667, 669
- Electives (11 hours): ExSc 662, 663, 671, 673, 693R, 766, 769, Chem 481, PDBio 565, or other courses as approved by your advisory committee.

#### *Athletic Training*

- Prerequisite: Be BOC certified or be eligible to become certified.
- Core Courses (13 hours): STAT 511, ExSc 630, 691, 699R (thesis, 6 hours)

- Required courses (13 hours): ExSc 625R (8 hours); 667 (2 hours); 693R (1 hour); 629R (2 hours).

- Elective (at least 8 credit hours): ExSc 560, 662, 663, 666, 668, or other courses as approved by your advisory committee.

### **Exercise Sciences - PhD**

The PhD in Exercise Sciences is designed to prepare students for leadership at the highest levels of their professions. Since most of the students who receive PhDs will become university or college faculty and will teach and publish in their chosen areas, students must be (1) well trained in the scientific bases of exercise science, (2) well acquainted with the scientific literature, and (3) able to do independent research.

#### **Requirements for Degree.**

- Credit hours: minimum 60 hours beyond the bachelor's degree (includes dissertation) in addition to supporting area prerequisites. Students who have earned a master's degree must complete at least 36 hours of additional graduate work.
- All doctoral students must complete an original research study and present it at a regional, national, or international conference or submit a manuscript to a refereed journal.
- Areas of specialization: the three areas have the following in common. The core and specialization must be taken at BYU:
- Research Core (22-26 Hours): ExSc 691, 693R, 751, 753, 797R (4 hours), 799R (18 hours).

#### *Exercise Physiology*

- Required courses (16 Hours): ExSc 666, 667, 669, 766, 769, PDBio 565.
- Supporting areas: minimum 18 hours of graduate credit, plus prerequisites, must be included in supporting areas approved by your dissertation committee. Suggested areas include:

physiology and developmental biology, biochemistry, health/wellness, nutrition, biomechanics.

#### *Health Promotion*

- Required: (16 Hours from the following): ExSc 640, 661, 666, 667, 669, 671, 673.
- Supporting areas: minimum 17 hours of graduate credit, plus prerequisites, must be included in supporting areas approved by your dissertation committee. Suggested areas include: health, nutrition, statistics, teacher and program evaluation, biomechanics/advanced exercise physiology.

#### *Physical Medicine and Rehabilitation*

- Required courses (18 Hours): ExSc 560, 625R (12 hours), 668.
- Supporting areas: minimum 16 hours of graduate credit, plus prerequisites, must be included in supporting areas approved by your dissertation committee. Suggested areas include: muscle function, pedagogy, physiology and developmental biology, biochemistry, molecular biology, nutrition, health/wellness.

#### *For All Specializations*

- No more than 9 hours of supporting area course work may be transferred from another university. One member of each student's committee must be from outside the college.
- PhD students must register for at least two consecutive 6-hour semesters on the BYU Provo campus.
- Dissertation.
- Examinations: (A) comprehensive examination; (B) oral defense of dissertation.

### FINANCIAL ASSISTANCE

Exercise Sciences provides 100% tuition waiver for doctoral students. The department also provides stipends for full time doctoral students. Financial assistance may be available in the form of graduate

teaching and graduate research assistantships for both MS and PhD students. These assistantships are awarded according to faculty and department needs.

### RESOURCES AND OPPORTUNITIES

Other resources exist in these areas:

*Anatomy & Biomechanics:* six cadavers and skeletons.

*Biomechanics:* three-dimensional infra-red motion analysis video system, force plate analysis.

*Exercise Biochemistry:* blood and muscle biochemistry, gel electrophoresis, muscle histochemistry, DNA and RNA analysis.

*Exercise Physiology and Health Promotion:* treadmills, bicycle ergometers, body composition analyses (DEXA and Bod Pod), strength testing, electromyography, expired gas analyses.

*Athletic Training:* two large, well-equipped facilities plus two satellite training rooms located in the Marriott Center and LaVell Edwards football stadium.

*For a more detailed description of the graduate program requirements, see the department Web page at <http://exercisesciences.byu.edu>*

### COURSE DESCRIPTION

#### EXSC

#### **501.Sports Medicine Pathology and Pharmacology. (3)**

Prerequisite(s): ExSc 320, PDBio 305; or equivalents.

Sports medicine pathologies and related pharmacology for a variety of sports medicine/allied health care professions.

#### **560.Orthopaedic Pathomechanics. (2)**

Prerequisite(s): ExSc 460 or equivalent.

Advanced analysis of neuromusculoskeletal deformities and/or injury. Therapeutic exercise and the use of orthoses.

#### **625R.Advanced Topics in Physical Medicine and Rehabilitation. (2)**

Prerequisite(s): ATC, PT, or instructor's consent.

Topics will be rotated and may include: electrotherapy, ultrasound, and diathermy; cryotherapy; orthotics; clinical and educational administration; functional testing and exercise; neural basis of rehabilitation; strength rehabilitation; joint mobilization and manual therapy; spinal manipulation and mobilization.

#### **625R.Clinical and Educational Administration. (2)**

#### **625R.Cryotherapy. (2)**

#### **625R.Electrotherapy, Ultrasound, and Diathermy. (2)**

The history, theory, evidence-based research and application of several therapeutic modalities used in athletic training, physical therapy, and occupational therapy. Topics include: deep heating modalities (ultrasound and diathermy); electrotherapy (TENS, IFC, NMES, PENS, HVPC, iontophoresis).

#### **625R.Functional Testing and Exercise. (2)**

#### **625R.Joint Mobilization and Manual Therapy. (2)**

The history, theory, evidence-based research, and application of joint mobilization of the ankle, knee, hip, shoulder, elbow and wrist joints; and positional release therapy.

#### **625R.Neural Basis of Rehabilitation. (2)**

## EXERCISE SCIENCES

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### **625R.Spinal Manipulation and Mobilization. (2)**

#### **625R.Strength Rehabilitation. (2)**

Different strength rehabilitation methods (and their history); examining their theoretical background and actual practice. Enhancing skills of critically reviewing literature.

#### **625R.Diagnostic Testing. (2)**

Prerequisite(s): ATC, PT, or instructor's consent.

Students will gain an understanding of the use and purpose of clinical research modalities available for research in Exercise Sciences (i.e. EMG, ultrasound/Doppler, nerve conduction velocity, sensory testing, muscle stimulation/TENS, Isothermix temperature measures, etc.).

#### **625R.Tissue Response to Injury. (2)**

Prerequisite(s): ATC, PT, or instructor's consent.

Students will gain a detailed understanding of the physiologic basis of musculoskeletal tissue injury. The class will focus on the process of inflammation and on skeletal muscle, tendon, ligament, bone and cartilage response to injury.

#### **629R.Athletic Training Practicum. (1-6)**

Academic and practical application of athletic training skills in the training room setting.

#### **630.Research Methods in Exercise Sciences. (3)**

Prerequisite(s): STAT 511

Understanding, designing, and conducting research, including analysis of data using common statistical techniques.

#### **640.Physical Activity and Health. (3)**

Prerequisite(s): ExSc 463, 464; or equivalents.

Role of physical activity and fitness in the prevention and reversal of disease, including type 2 diabetes, heart disease, cancer, osteoporosis, etc., and in the promotion of health.

#### **661.Advanced Worksite Wellness. (3)**

Prerequisite(s): ExSc 455 or equivalent.

Management for effectively designing, marketing, implementing, and administering health promotion programs.

#### **662.Mechanical Analysis of Activities. (2)**

Prerequisite(s): ExSc 362 or equivalent.

Analysis of human movement and sport activities using kinematic and kinetic descriptions and models of motion based on three-dimensional video and force plate techniques.

#### **663.Research Techniques in Biomechanics of Sport. (2)**

Prerequisite(s): EXSC 662; ExSc 362 or equivalent.

Theory and practice of research techniques in biomechanics: statics, dynamics, body segment parameters, photo instrumentation, electronic instrumentation, digital computer techniques, literature sources, and laboratory fundamentals.

#### **666.Exercise Physiology. (3)**

Prerequisite(s): ExSc 363 or equivalent.

Adjustments made by the body to accommodate physical activity.

#### **667.Laboratory Methods and Procedures. (2)**

Prerequisite(s): ExSc 363 or equivalent; 666 or concurrent registration.

Basic techniques and procedures used in human performance laboratories.

#### **668.Orthopaedic Anatomy. (4)**

Prerequisite(s): PDBio 220, ExSc 390; or equivalents.

Investigating orthopaedic anatomy. Students dissect cadavers.

#### **669.Exercise, Testing, and Prescription. (2)**

Exercise testing and interpretation. Exercise prescription for healthy children and adults, athletes, and various clinical and special populations.

#### **670.Basic Electrocardiography. (2)**

Prerequisite(s): Human physiology and exercise physiology.

Cardiovascular physiology. Introduction to normal conduction pathways of the heart and common arrhythmias. Resting and exercise 12-lead ECG preparation, recording, and interpretation.

#### **671.Advanced Lifestyle and Chronic Disease Prevention. (3)**

Prerequisite(s): ExSc 387 or equivalent.

Managing health risks, particularly those relating to cardiovascular disease, cancer, and obesity.

#### **673.Advanced Obesity and Weight Management. (3)**

Prerequisite(s): ExSc 480 or equivalent.

Etiology, treatment, and prevention of obesity in various populations, emphasizing the role of exercise in weight control programs.

#### **688R.Health Promotion Practicum. (1-9)**

#### **691.Seminar. (1)**

Orientation to graduate work in the exercise sciences.

#### **693R.Readings Seminar. (1)**

Searching, critiquing, and interpreting scientific literature with goal of conducting scientific research.

#### **693R.Readings Seminar in Athletic Training. (1)**

Prerequisite(s): ExSc 666 or concurrent enrollment for exercise physiology section.



**693R.Readings Seminar in ...** (1)  
Prerequisite(s): ExSc 666 or concurrent enrollment for exercise physiology section.

**699R.Master's Thesis.** (1-9)

**751.Doctoral Seminar: Professional and Scholarly Writing.** (1)

**753.Doctoral Seminar: Research and Grantsmanship.** (1)

**766.Advanced Exercise Physiology: Cardiopulmonary.** (3)  
Prerequisite(s): EXSC 666 & EXSC 667

Cardiovascular and pulmonary physiology, assessments, responses to exercise, and interventions.

**769.Advanced Exercise Physiology: Skeletal Muscle.** (3)  
Prerequisite(s): EXSC 666; Chem 481 or equivalent.

Effects of acute and chronic exercise on anatomy, physiology, and biochemistry of skeletal muscle.

**797R.Individual Research and Study in Exercise Sciences.** (1-9)  
Prerequisite(s): Undergraduate major in exercise sciences; matriculation for graduate study in the department.

**799R.Doctoral Dissertation.** (1-18)

## FACULTY

**Bailey, Bruce W.** *Associate Professor*, PhD, University of Kansas, 2005. Health Promotion

**Davidson, Lance** *Assistant Professor*, PhD, Queens University, 2007. Exercise Physiology

**Draper, David O.** *Professor*, EdD, Northern Illinois University, 1988. Athletic Training

**Feland, J. Brent** *Associate Professor*, PhD, PT, Brigham Young University, 1999. Anatomy; Therapeutic Exercise; Rehabilitation

**George, James D.** *Associate Professor*, PhD, Arizona State University, 1995. Exercise and Wellness

**Hager, Ronald Lee** *Associate Professor*, PhD, Arizona State University, 1997. Motor Control; Children's Physical Activity

**Hopkins, J. Tyson** *Professor*, PhD, Indiana State University, 2000. Athletic Training

**Hunter, Iain** *Professor*, PhD, Oregon State University, 2001. Kinesiology; Biomechanics

**Hyldahl, Robert D.** *Assistant Professor*, PhD, University of Massachusetts Amherst, 2011. Athletic Training, Exercise Physiology

**Johnson, A. Wayne** *Associate Professor*, PhD, PT, Brigham Young University, 2007. Anatomy; Rehabilitation; Therapeutic Exercise

**LeCheminant, James D.** *Associate Professor*, PhD, University of Kansas, 2005. Health Promotion

**Lockhart, Barbara D.** *Professor*, EdD, Brigham Young University, 1971. Administration; Ethics and Philosophy

**Mack, Gary W.** *Professor*, PhD, University of Hawaii, 1984. Biomedical Sciences

**Mitchell, Ulrike H.** *Assistant Professor*, PhD, PT, Brigham Young University, 2005. Anatomy; Rehabilitation; Therapeutic Exercise

**Myrer, J. William** *Professor*, PhD, Brigham Young University, 1983. Anatomy; Orthopaedic Impairments and Rehabilitation

**Parcell, Allen C.** *Professor*, PhD, Ball State University, 1998. Exercise Physiology

**Ridge, Sarah T.** *Assistant Professor*, PhD, University of Delaware, 2010. Biomechanics

**Seeley, Matt** *Associate Professor*, PhD, University of Kentucky, 2006. Exercise Science; Biomechanics

**Tucker, Larry A.** *Professor*, PhD, Southern Illinois University, 1981. Health Promotion; Research Methods

**Vehrs, Pat R.** *Associate Professor*, PhD, Brigham Young University, 1991. Exercise Physiology

## FAMILY LIFE

**Director:** Busby, Dean

**Associate Director for Curriculum:** Robinson, Clyde C.

**Associate Director for Curriculum:** Carroll, Jason

**Marriage, Family, and Human**

**Development Graduate Coordinator:** Walker, Laura

**Marriage and Family Therapy**

**Graduate Coordinator:** Bean, Roy

2086 JFSB, Provo, UT 84602-6710  
(801) 422-2060

<https://familylife.byu.edu/Pages/GraduatePrograms.aspx>

## THE PROGRAMS OF STUDY

The goal of the graduate programs in the School of Family Life is to provide education that teaches students to conduct research that contributes to the understanding and enhancement of human development and marriage and family relationships. In addition, the graduate programs will educate students in the prevention and intervention that promotes quality family living across generations. The graduate programs in the school are noted for contributions in marriage preparation, family studies, social development, and marriage and family therapy.

Four degrees are associated with the School of Family Life: Marriage, Family, and Human Development MS; Marriage, Family, and Human Development PhD; Marriage and Family Therapy MS; Marriage and Family Therapy PhD.

Marriage and Family Therapy Program

Phone: (801) 422-5680

Address: 274 TLRB, Provo, UT 84602-6710

Web site:<http://mft.byu.edu/>

Marriage, Family and Human Development Program

Phone: (801) 422-2060

Address: 2086 JFSB, Provo, UT 84602

Web site:<http://mfhd.byu.edu/>

## Marriage and Family Therapy - MS

The marriage and family therapy program offers the master of science degree as a two-year program. The purpose of this degree is to prepare graduate students who will (a) deliver effective therapy, (b) think clearly, (c) communicate effectively, (d) understand important ideas in their own cultural tradition as well as that of others, and (e) establish clear standards of intellectual and emotional integrity. In addition, it is intended that they will critically evaluate MFT research and contribute to the development of new knowledge. More specifically, at the end of their program students will (a) pass the Association of Marital and Family Therapy Regulatory Boards (AMFTRB) National Licensing Exam, (b) be effective clinicians and employable as interns, and (c) add knowledge to the field of marriage and family therapy by presenting and defending theses. Our intent is to prepare the students to function in a wide variety of MFT settings. The curriculum is based on state licensure/certification requirements and is accredited by the Commission on Accreditation of the American Association for Marriage and Family Therapy. The master's degree is the basic educational credential for independent practice in marriage and family therapy. It also prepares students for doctoral study. In cases where students wish to complete both their M.S. and Ph.D. studies at BYU, they may apply to the Ph.D. program only after being admitted to and successfully completing the M.S. degree program.

### Requirements for Degree.

- Credit hours (61): minimum 55 course work hours plus 6 thesis hours (699R).

- Required courses: MFT 600, 630, 645, 649, 650, 651, 652, 653, 654, 655R (16 hours), 656, 670, 699R (6 hours); MFHD 663, Soc 605; electives (3 hours).

- Clinical requirement: 500 hours of direct face to face client experience.
- Thesis.
- Examination: oral defense of thesis.

## Marriage and Family Therapy - PhD

The program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education of the American Association for Marriage and Family Therapy and has three interrelated emphases: Clinical Practice, Teaching/Supervision, and Research.

BYU offers three options for the Ph.D. degree in MFT. The first option, for students who already have an MFT master's degree from an accredited institution, takes approximately three years to complete. The second option, for post-baccalaureate students, should take approximately five years to complete. For this option the master's curriculum is followed during the first two years, with the M.S. degree awarded at the completion of those requirements. If the student completes the Master's Degree with no difficulty and elects to continue into the Ph.D. program, they must go through the formal application process and be accepted to the Ph.D. program. The third option, for students with a non-MFT master's degree program in a clinical field such as Social Work or Counseling Psychology, takes approximately four years to complete. For this option the students follow master's curriculum for approximately one year to complete MFT Master's Degree curriculum not present in the previous clinical program. The additional courses required of these students allow the students to meet MFT licensing requirements as presented in the Master's Degree requirements. When all educational requirements for licensure in MFT

are completed, they begin the Ph. D. curriculum. In this circumstance, the program may require approximately four years for graduation.

#### Requirements for Degree.

- Credit Hours (63): minimum 45 course work hours beyond completion of the master's degree coursework and clinical experience; 6 hours of internship and supervision mentoring; plus 18 dissertation hours (MFT 799R) Dissertation.
- Required courses: MFT 751 Advanced Theory in MFT; MFT 753 Advanced Clinical Specialization in MFT; MFT 754 Advanced Theory in Family Therapy for Children and Adolescents; MFT 750 Supervision in MFT; MFT 700 Advanced Research Methodology in MFT; MFT 793R Research Seminar in MFT; MFT 603R Research Practicum; Soc 606 or its equivalent; and 6 hours of Advanced Statistical Methods and electives as determined in consultation with graduate committee.
- Minor: any minor approved by graduate committee, but not required.
- Clinical requirement: a minimum of 500 hours of direct client contact after completing the MFT MS requirements.
- Dissertation.
- Examinations: All doctoral students are required to successfully defend their dissertation orally, complete the Doctoral Portfolio papers, presentations, and publications in clinical practice, teaching/supervision, and research which serves as a comprehensive examination.
- Professional development internship

Marriage & Family Therapy Program

Phone: (801) 422.5680

Address: 234 TLRB, Provo, UT 84602

Website: <http://mft.byu.edu>

#### ***Marriage, Family, and Human Development - MS***

The MS degree in MFHD provides students with a broad-based understanding in family sciences and human development. Students construct an individualized program of study that helps them acquire depth in one or more of these two core areas and/or other areas in the field, such as teaching, and family life education. For some the MS is a terminal graduate degree that enhances professional opportunities in educational settings. For other students this degree is designed to prepare them for doctoral study.

The graduate program is designed to (1) address the theories, research, and practices that strengthen marriages, (2) enhance the development of children, and (3) unfold the characteristics of quality nurturing relationships across generations.

Typically from six to ten students are admitted each year to the program, with the proportion of MS and PhD degree candidates varying each year.

*For additional information about scholarships, assistantships, ongoing faculty research programs, and research facilities, go to <http://mfhd.byu.edu/>*

#### **Requirements for Degree.**

- Credit hours: 33.
- Required Core:  
MFHD 611, 612, 691, 760

Statistics recommended: MFHD 605.  
Also approved: Psych 502, Soc 606, Stat 511

Thesis: 6 credit hours of MFHD 699R

- Program of study: approved by the student's committee and the graduate coordinator. It may include courses in early childhood education, family life education, family processes, human development, gerontology, or resource management and must be submitted by the end of the first semester of the first year.

- Thesis.
- Examination: defense of thesis and course work.

#### ***Marriage, Family, and Human Development - PhD***

The graduate program is designed to (1) address the theories, research, and practices that strengthen marriages, (2) enhance the development of children, and (3) unfold the characteristics of quality nurturing relationships across generations.

Typically from six to ten students are admitted each year to the program, with the proportion of MS and PhD degree candidates varying each year.

For additional information about scholarships, assistantships, ongoing faculty research programs, and research facilities, go to <http://mfhd.byu.edu/>.

The primary focus of doctoral study is to help students become effective educators and scholars. Many graduates find professional positions in university departments related to family studies or human development. Some find positions in community settings, research organizations, or the mass media; and others choose to work in business settings.

The PhD degree in MFHD provides integrated and in-depth learning experiences in family studies and human development. It also offers the opportunity to acquire expertise in a number of different aspects of the field.

Offered on the basis of competence rather than the completion of a specified number of courses, the degree usually requires a minimum

## FAMILY LIFE

54 hours of course work and 18 dissertation hours. If students have completed study beyond their master's degree, their transcript is closely evaluated to determine if any courses or other experiences can be applied toward the doctoral program of study.

### Requirements for Degree.

- Credit hours (72): minimum 54 course work hours plus 18 dissertation hours.
- Required courses: MFHD 691, 760. Advanced Statistics - 9 credit hours: Must take one semester of MFHD 706R (Advanced Statistics)

Semester 1: Advanced Structural Equations and Hierarchical Linear Models

Semester 2: Panel Data and Generalized Linear Models

- And six credit hours from the following:

MFHD 605 (3 credits), Psych 502 (4 credits), Soc 606 (3 credits), MFHD 706R (3 credits), Stat 511 (3 credits)

- Program of study: approved by the student's committee and the graduate coordinator. It may include courses in early childhood education, family life education, family processes, home economics, human development, gerontology, or resource management, and it must be submitted by the second semester of the first year.
- Dissertation: 18 hours minimum.
- Examinations: (A) a qualifying written examination; (B) oral defense of dissertation.

### FINANCIAL ASSISTANCE

The programs offer graduate research and teaching assistantships, supplementary awards and scholarships, and internships as aid. Once admitted to the program, the student will receive specific information regarding their funding package.

## RESOURCES AND OPPORTUNITIES

### Certified Family Life Educator

**Program.** Students in the School of Family Life may enhance their graduate programs by taking course work that qualifies them for provisional status as a certified family life educator (CFLE). This is a nationally recognized credential given by the National Council on Family Relations for professionals who specialize in teaching and enrichment of marriage and family relationships. The graduate programs in the School of Family Life have been approved by the National Council on Family Relations as offering a quality curriculum that fulfills many of the CFLE requirements.

**Family Studies Center.** An interdisciplinary research institute focusing on studies related to all aspects of the family, the center encourages and supports research on family-related topics ranging from prenatal development to problems of aging. Many of the faculty in the college are actively engaged in such research and receive support from the center. Activities include providing grants, research assistance, conferences on special topics every two years, and outreach to bring valuable information on strengthening families to both families and family practitioners.

**Comprehensive Clinic.** The Comprehensive Clinic at Brigham Young University is a unique interdisciplinary training and research facility housing the finest video and computer facilities available and a staff of skilled technicians and secretaries to support graduate student and faculty research. The clinic currently functions as a training facility for an AAMFT-approved marriage and family therapy PhD and for MS training programs. In addition, the clinic provides the university and the broader geographical community with mental health services involving between 200 and 250 clients each week.

**Family, Home, and Social Sciences Computing Center.** The center assists faculty and students with social science data processing and other computing needs on mainframe and personal computers. Technical support and consultation services for both statistics and graphics are available to students working on research projects, theses, and dissertations.

### Child and Family Laboratories.

These excellent facilities provide a practicum setting in which graduate students develop skills in conducting and interpreting research involving small children.

The School of Family Life also provides additional research and academic support to family life programs through the **Camilla Eyring Kimball Chair of Home and Family Life.**

## COURSE DESCRIPTION

### MFHD

#### 501R. Workshop in Marriage, Family, and Human Development. (1-2)

Prerequisite(s): 8 hours in the School of Family Life or the School's Director's consent.

Intensive study in applying principles of specified family sciences, subject matter in early childhood education, child development, family relationships, family resource management, or marriage/family therapy.

#### 511. Familial Influences on Children's Social Development. (3)

Prerequisite(s): SFL 331 or higher.

Current theories and research on social development, peer relations, and behavior. Familial/parenting effects as moderated by beliefs, genetics, gender, social cognitions, culture, child guidance, interventions.



**513. Applied Statistics in the Social Sciences. (3)**

Prerequisite(s): SFL 290

This course applies statistical principles to social science problems by utilizing the basics of statistical software in developing and testing research questions as well as conducting univariate and multivariate statistics such as t-tests, ANOVAs, and regression models.

**514. Theories of Human Development. (3)**

Prerequisite(s): SFL 331 or higher.

Models and concepts in dominant contemporary developmental theories.

**542. Work and Family. (3)**

Introduction to contemporary work/family issues. Framework for helping parents and managers deal effectively with work/family issues at work and home.

**550. (MFHD-Soc) Contemporary Family Theories. (3)**

Prerequisite(s): SFL 451, Soc 310, 311; or equivalents.

Introduction to basic micro, macro, and processual approaches to study of the family; social and political theory on the family; philosophical issues and assumptions underlying family theory, research, and practice.

**566. Family Life Education in the University. (3)**

Prerequisite(s): Instructor's consent.

Delivering family life education in university settings. Working with a faculty mentor, making presentations, and preparing basic instructional materials.

**567R. Practicum in Family Life Education. (1)**

Prerequisite(s): MFHD 566 or instructor's consent.

Supervised experience teaching family living courses in a university setting.

**595R. Special Topics in Marriage, Family, and Human Development. (1-3)**

Prerequisite(s): For marriage, family, and human development major; instructor's consent.

Individual study for qualified students.

**600. Multiple Regression Analysis. (3)**

Prerequisite(s): MFHD 513; or MFHD 691

Techniques and assumptions of regression models, data management, and analysis. Topics include ordinary least squares, binary, ordinal, and multiple logistic regression, and models for count variables.

**602. (MFHD-Soc) Experimental Design. (3)**

Prerequisite(s): MFHD-Soc 600, Stat 510 or equivalent, or instructors consent.

Research methods, logic, writing, and data analysis.

**603R. Research Practicum. (3)**

Prerequisite(s): Instructor's consent.

Design, data collection, data analysis, and write-up.

**605. Structural Equation Modeling in Social Sciences. (3)**

Prerequisite(s): Stat 511 or equivalent.

Basic tools in structural equation modeling (SEM), including confirmatory factor analysis (CFA), latent variables, and combining CFA with regression. Applications of SEM to (a) multiple groups, (b) dichotomous and count outcomes, and (c) longitudinal or repeated measures.

**611. Advances in Human Development. (3)**

Prerequisite(s): Graduate standing or instructor's consent.

Recent advances in developmental psychology emphasizing infant development as it informs our understanding of perceptual, cognitive, linguistic, and social development in later childhood.

**612. Introduction to Research and Theory in Family Science. (3)**

Prerequisite(s): Instructor's consent.

Research and theories about current topics in family science.

**625. Outreach in Family Life Education. (3)**

Principles and practices for the development, implementation, and evaluation of family life education programs for audiences and settings outside the traditional classroom: community workshop teaching, print media, internet technology, radio, and television.

**645. Religion and Family. (3)**

Major research findings and theories linking religious belief, practice, and community to marriage and family life from the disciplines of human development, psychology, sociology, family studies, health, family therapy, and religious studies.

**665. Philosophy in Family Life Education. (3)**

Prerequisite(s): SFL 480 or instructor's consent.

Ethical issues and interpretive frameworks in human science that address quality of life in families.

**691. Graduate Research Methods. (3)**

Prerequisite(s): SFL 290, Stat 121; or equivalents.

Building on introductory knowledge, learning and exploring the quantitative research designs most commonly used in marriage, family, and human development studies.

**693R. Independent Readings. (1-3)****695R. Special Topics. (1-3)**

Variable topics, including socialization of children, therapeutic intervention with special populations, and marital processes.

**695R. Child Socialization. (1-3)**

## FAMILY LIFE

**695R.Getting Together, Mate Selection, and Early Marriage.** (3)

**695R.Social Withdrawal and Self-Processes.** (3)

**699R.Master's Thesis.** (1-9)

**706R.(MFHD-Soc) Advanced Statistical Methods.** (3)  
Prerequisite(s): Soc 605 or MFHD 605 or Psych 502.

Topics include advanced structural equations and hierarchical linear models, or panel data techniques and generalized linear models.

**760.Family Theory Construction.** (3)

Introduction to family theories and applied experience in theory construction and analysis focusing on familial processes and human development.

**792R.(MFHD-Soc) Family Symposium.** (0.5)

Presentation and discussion of professional papers about the family.

**799R.Doctoral Dissertation.** (1-9)

### **MFT**

**501R.Workshop in Marriage and Family Therapy.** (1-2)  
Prerequisite(s): Instructor's consent.

Training in delivery of and research about psychoeducational programs for couples and families.

**595R.Special Topics in Marriage and Family Therapy.** (1-2)

Prerequisite(s): Marriage and family therapy major status; instructor's consent.

Individual study for qualified students.

**600.Research Methods for Marriage and Family Therapy.** (3)

Overview of research methods commonly used in the social sciences with a particular emphasis in marriage and family therapy. Experimental design, survey research, and qualitative methods are included.

**603R.Research Practicum.** (3)

Prerequisite(s): Instructor's consent.

Design, data collection, data analysis, and write-up.

**605.Advanced Statistics in Family Studies.** (3)

Statistical analysis of family science research. Outcomes include understanding research findings in research articles, ability to perform and interpret regression analysis, ANOVA, and other statistical procedures using SPSS.

**630.Theoretical Foundations of Family Systems for Marriage and Family Therapy.** (3)

Prerequisite(s): Marriage and family therapy major status; or SFL 451 and instructor's consent.

Systems paradigm and theories for understanding marriage and family processes and as a foundation for marriage and family therapy intervention.

**645.Analysis and Treatment of Human Sexual Development.** (3)

Prerequisite(s): MFT 650

Knowledge and skill required to analyze and treat questions related to human sexual development.

**649.Addictions and Violence in Families.** (3)

Assessment and treatment of multiple-problem family systems, emphasizing addictions and abuse.

**650.Theoretical Foundations of Marital and Family Therapy.** (3)

Epistemological and theoretical issues in marital and family therapy, including normal family processes and personal and intergenerational family issues.

**651.Psychopathology and Assessment in Marriage and Family Therapy.** (3)

Diagnosing and assessing mental disorders and dysfunctional relationships. Etiology and diagnosis of individual, marital, and family psychopathology.

**652.Marital and Individual Psychotherapy.** (3)

Assessment, intervention techniques, therapist's role, and principle processes in theories of systemic individual and marital psychotherapy.

**653.Family and Multigenerational Psychotherapy.** (3)

Systemic theories and strategies to diagnose and treat specific problems in dysfunctional families.

**654.Issues of Gender and Ethnicity in Marriage and Family Therapy.** (3)

Gender, ethnic, and minority issues in family systems, society, and clinical practice as they relate to individual, marital, and family treatment.

**655R.Intermediate Practicum in Marriage and Family Therapy.** (2-3)

Experience in counseling individuals, premarital and marital dyads, families, groups of dyads, and multiple families.

**656.Ethical, Legal, and Professional Issues for Family Therapists.** (3)

**663.The Individual and Family Over the Life Course.** (3)

Stability and change in individual development and family relationships over the life course.

**670R.Group Process Interaction.** (1-2)

Theoretical foundations, key issues and themes, and instruction in facilitating group therapy practice.

**693R.Independent Readings.** (1-3)

**695R.Special Topics. (1-3)**

Variable topics, including (1) Spirituality in Clinical Perspective and Practice, (2) Premarital and Remarital Intervention, (3) Play Therapy, (4) Research Methods for MFT, and (5) Group Process.

**695R.Play Therapy. (1-3)****699R.Master's Thesis. (1-9)****700.Family Therapy Research Methods. (3)**

Prerequisite(s): MFHD 600, Soc 303R; or equivalents.

Advanced study of MFT research methods, including meta-analysis, power analysis, grant writing, and other advanced topics.

**750.Supervising Marriage and Family Therapy. (3)**

Theory, research, and practice of supervising marriage and family therapists. Supervised experience.

**751.Advanced Theory in Marriage and Family Therapy. (3)**

Advanced family therapy approaches to the diagnosis and treatment of affective, behavioral, and cognitive disorders.

**753.Advanced Clinical Specialization in Marriage and Family Therapy. (3)**

Advanced approaches in treating dysfunctional individual, marital, and family systems.

**754.Family Therapy for Children and Adolescents. (3)**

Family psychotherapy with children and adolescent issues, emphasizing treatment and family interventions. Various theoretical perspectives as well as diagnosis and assessment.

**755R.Advanced Practicum in Marriage and Family Therapy. (2-3)**

Prerequisite(s): MFT 650, 655R, or equivalent.

**760R.Supervision Practicum in Marriage and Family Therapy. (1)**

Prerequisite(s): MFT 750 and instructor's consent.

Supervised experience in supervising practicum students.

**770R.Clinical Internship. (1)**

Full-time family therapy training and practice at an approved agency.

**793R.Research Seminar in Marriage and Family Therapy (1-3)**

Integrating and applying research design and statistics to the study of marital and family therapy.

**799R.Doctoral Dissertation. (1-9)****FACULTY**

**Bean, Roy A.** *Associate Professor*, PhD, Brigham Young University, 1997. Parent-Adolescent Relationships in Ethnic Families; Culturally Competent Family Therapy

**Bradford, Angela B.** *Assistant Professor*, PhD, Auburn University, 2012. Mechanisms of Change in Couples' Interventions; Neurocardiological Factors in Therapy; Systemic Examinations of Individual-Level Phenomena

**Busby, Dean M.** *Professor*, PhD, Brigham Young University, 1990. Premarital Couples; Relationship Assessment

**Butler, Mark** *Professor*, PhD, Texas Tech University, 1996. Family Therapy

**Carroll, Jason S.** *Professor*, PhD, University of Minnesota, 2001. Marriage Relationships; Professional-Family-Community Partnerships

**Coyne, Sarah** *Associate Professor*, PhD, University of Central Lancashire, 2004. Effect of Media on Children's Development

**Crane, D. Russell** *Professor*, PhD, Brigham Young University, 1979. Marriage and Family Therapy

**Day, Randal** *Professor*, PhD, Brigham Young University, 1977. Family Studies

**Dollahite, David C.** *Professor*, PhD, University of Minnesota, 1988. Marriage and Family Processes in Christian, Jewish, and Muslim Families; Latter-day Saint Marriage and Family Life

**Draper, Thomas W.** *Professor*, PhD, Emory University, 1976. Early Childhood Education/Human Development

**Duncan, Stephen F.** *Professor*, PhD, Purdue University, 1988. Family Life Education; Marriage Preparation

**Dyer, W. Justin** *Assistant Professor*, PhD, University of Illinois, 2009. Fatherhood; Incarcerated Fathers; Fathers of Children with Disabilities; Quantitative Methodology

**Harper, James M.** *Professor*, PhD, University of Minnesota, Minneapolis, 1979. Family Interaction; Sibling Relationships; Aging Couples

**Hart, Craig H.** *Professor*, PhD, Purdue University, 1987. Human Development and Early Childhood Education

**Hawkins, Alan J.** *Professor*, PhD, Pennsylvania State University, 1990. Educational and Policy Interventions to Strengthen Marriage

**Hill, Jeff** *Professor*, PhD, Utah State University, 1995. Work and Family; Family Relationships

**Holmes, Erin K.** *Assistant Professor*, PhD, University of Texas at Austin, 2006. Fathering; Transition to Parenthood

## FRENCH AND ITALIAN

**James, Spencer L.** *Assistant Professor*, PhD, Pennsylvania State University, 2012. Marriage and Family; Social Demography; Relationship Quality, Dissolution, and Formation; Quantitative Methods

**Johnson, Lee** *Assistant Professor*, PhD, Kansas State University, 1998. Benefits of adding physical exercise to couple and family therapy interventions, research methods, role physiology plans in couple and family relationships

**Lambert, Nathaniel M.** *Assistant Professor*, PhD, The Florida State University, 2010. Self-regulation Processes within Relationships; Positive Relationship Processes

**Larson, Jeffry H.** *Professor*, PhD, Texas Tech University, 1980. Marriage and Family Therapy; Family Life Education

**Lee, Chien-ti** *Assistant Professor*, PhD, Utah State University, 2010. Cross-cultural adolescent psychosocial development

**Miller, Richard** *Professor*, PhD, University of Southern California, 1989. Marital Process over the Life Course; Multicultural Families

**Nelson, David A.** *Associate Professor*, PhD, University of Minnesota Institute of Child Development, 1999. Child Aggression and Victimization; Cross-Cultural Parenting and Child Development

**Nelson, Larry J.** *Professor*, PhD, University of Maryland, 2000. Social Development of Young Children; Emerging Adulthood

**Padilla-Walker, Laura** *Associate Professor*, PhD, University of Nebraska, Lincoln, 2005. Parenting; Adolescents' Moral/Prosocial Development

**Porter, Chris** *Associate Professor*, PhD, Purdue University, 1996. Infancy and Toddlerhood

**Robinson, Clyde C.** *Associate Professor*, PhD, University of North Carolina, Greensboro, 1982. Human Development/Early Childhood Education

**Roper, Susanne Olsen** *Associate Professor*, PhD, University of Georgia, 1992. Parenting and Children's Social Development; Families of Children with Chronic Conditions and Disabilities

**Sandberg, Jonathan G.** *Professor*, PhD, Kansas State University, 1998. Couples and Health; Marriage and Family Therapy Outcome, Process, and Clinical Research

**Willoughby, Brian J.** *Assistant Professor*, PhD, University of Minnesota, 2009. Emerging Adult Sexuality and Dating; Attitude Formation and Development

**Yorgason, Jeremy B.** *Associate Professor*, PhD, Virginia Tech, 2003. Family Gerontology; Health in Marriage

## FRENCH AND ITALIAN

**Chair:** Cropper, Corry  
**Graduate Coordinator:** Sprenger, Anca Mitroi

3134 JFSB, Provo, UT 84602-6706  
(801) 422-2209  
[french\\_italian@byu.edu](mailto:french_italian@byu.edu)  
<http://frenital.byu.edu/>

### THE PROGRAMS OF STUDY

The programs in French are designed to help students improve their research ability, further develop critical thinking and writing skills, broaden their understanding of French and francophone cultural history, and increase their understanding of the French language. The programs may also serve as a step toward doctoral studies or toward a career in teaching (SLaT).

One degree is offered through the Department of French and Italian: French Studies-MA. An MA in Second Language Teaching (French) is also offered as part of the College of Humanities' Second Language Teaching (SLaT) program. See description in Center for Language Studies section of this catalog.

The average number of students admitted to the program is from four to five per year. Most students require four semesters to complete the degree, but it is possible to complete it in one year.

### French Studies - MA

The departmental MA concentrates on establishing a solid foundation in French studies with a particular emphasis on literature and analytical skills. The thesis should represent in both substance and scope significant research that contributes to the discipline of French studies. Most students also benefit from additional training and experience as research assistants or as teachers in lower-division French classes.



**Requirements for Degree.**

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Fren 699R).
- Required courses: Fren 660R Critical Theory or equivalent; minimum 18 credit hours in French; maximum 3 credit hours in an approved course in a related field such as comparative literature, humanities, linguistics, or romance philology; 6 hours of Fren 699R (thesis). Students may petition to replace up to 3 credit hours of French with course work in a related field.
- Writing project: thesis.
- Examinations: comprehensive written and oral examinations on course work and reading list. Oral defense of thesis.

**FINANCIAL ASSISTANCE**

Several graduate teaching fellowships and a few partial-tuition scholarships, based on need and academic record, are available.

**RESOURCES AND OPPORTUNITIES**

- Foreign Language Student Residence.
- Internships in French-speaking countries.
- Teaching opportunities in France and at BYU as Student Instructors
- Graduate Student Conferences at BYU and elsewhere.
- Graduate Mentoring Grants to support specialized research topics.
- Departmental Symposia featuring guest speakers.
- International Cinema featuring French-speaking films.
- French Club activities including the production of plays, cultural events, etc.

- Opportunities to publish in and/or to edit the departmental journal, *Lingua Romana*.

*For a more detailed description of the graduate program requirements, see its online handbook at the French and Italian Department home page and consult the MA French Studies link under the Programs tab.*

**COURSE DESCRIPTION****FREN****510.MA Practicum 1. (1)**

Prerequisite(s): Graduate status.

Critical strategies and interpretative skills necessary for MA examinations.

**511.MA Practicum 2. (1)**

Prerequisite(s): Graduate status.

Critical strategies and interpretative skills necessary for MA examinations.

**512.MA Practicum 3. (1)**

Prerequisite(s): Graduate status.

Research tools and methods, the process of selecting a thesis topic, compiling a bibliography, and writing a prospectus.

**533.Advanced Studies in French Linguistics. (3)**

Advanced study of linguistic features such as phonetics and phonology, semantization, lexical development, morphology, and contrastive syntax.

**599R.Academic Internship: French Language Field Experience. (3)**

Prerequisite(s): Program coordinator's consent.

On-the-job experience in French; research paper analyzing the experience and other requirements as graduate coordinator sees fit.

**620R.Advanced Studies in French Culture. (3)**

Prerequisite(s): Admittance to MA program.

In-depth study of French historical, political, and social issues or artistic trends.

**630R.Studies in Periods and Movements. (3)**

Approaches to literature from the perspective of historical periods and/or cultural or political movements.

**640R.Author Studies. (3)**

Major authors from a variety of critical perspectives.

**650R.Studies in Genre. (3)**

Literary genres.

**660R.Studies in Theory and Interpretation. (3)**

Literary theory or theoretical applications to literary interpretation.

**690R.Seminar in French. (1-3)**

Prerequisite(s): Admittance to MA program.

Group or individual study supervised by graduate faculty member in varying topics of specific interest in French.

**690R.Principles for Language Teachers. (1-3)**

Prerequisite(s): Admittance to MA program.

**699R.Master's Thesis. (0.5-6)**

## GEOLOGICAL SCIENCES

### FACULTY

**Cropper, Corry** *Professor*, PhD, University of Illinois, 1998. Nineteenth Century; French Short Story; Cultural History of Sports

**Erickson, Robert G.** *Assistant Professor*, PhD, Brigham Young University, 2000. Instructional Psychology and Technology; Second Language Acquisition

**Hudson, Robert J.** *Assistant Professor*, PhD, University of California, Los Angeles, 2008. French Renaissance, Lyricism; Gallicism; Anthropology; Film

**LeBras, Yvon** *Professor*, PhD, Laval University, 1992. Seventeenth Century; French Canadian Novel; Travel Literature; Accredited Translation

**Lee, Daryl** *Associate Professor*, PhD, Yale University, 1999. French Verse; Nineteenth Century; Film; Politics and Literature; Paris and Literature

**Olivier, Marc** *Associate Professor*, PhD, University of Washington, 1999. Technology and Culture; Old Regime Science and Literature; Film

**Sprenger, Anca Mitroi** *Associate Professor*, PhD, University of Southern California, 1997. Eighteenth-Twentieth Centuries; Literature and the Sacred; Canadian Literature

**Sprenger, Scott M.** *Professor*, PhD, Emory University, 1995. Nineteenth Century; Twentieth Century; Film; Anthropology

**Unlandt, Nicolaas G. W.** *Associate Professor*, DLitt, University of Amsterdam, Netherlands, 1992. Middle Ages; Medieval Languages; Troubadour Poetry

### GEOLOGICAL SCIENCES

**Chair:** McBride, John H.  
**Graduate Coordinator:** Dorais, Michael J.

S389 ESC, Provo, UT 84602-4606  
(801) 422-3918  
[geology\\_office@byu.edu](mailto:geology_office@byu.edu)  
<http://www.geology.byu.edu>

### THE PROGRAMS OF STUDY

Geology is the science that reveals how the Earth works. The graduate program in geology at Brigham Young University prepares scientists to solve many of society's environmental and resource problems.

The department offers one degree: Geology-MS. Areas of specialization include: Earth Science Education, Environmental Geology, and Geology.

The expected duration of the MS program is two years for full-time students who enter without deficiencies. The MS degree is designed to give the student a solid foundation in the theoretical and applied aspects of geology and a strong research experience. The thesis component allows each student to develop skills in defining a significant problem, developing a research strategy, acquiring and analyzing data, and technical writing. A MS degree in geology prepares a student for a wide variety of employment opportunities in industry, education, and government, or to pursue a doctoral degree.

The department typically has 30 MS students.

### Geology - MS

Pursuit of the MS degree not only helps prepare students for exciting career opportunities in areas of distinct benefit to mankind, but it

also allows them to experience the challenges and rewards of modern scientific research. It is expected that the thesis work will culminate in new understanding of a problem of scientific significance and that results will be published in a reputable scientific journal.

Areas of specialization: Earth Science Education, Environmental Geology, and Geology.

### Requirements for Degree.

Credit hours (30): minimum 24 course work hours plus 6 thesis hours (Geol 699R); 1 hour of Geol 591R.

Required courses:

- Geology: Geol 601 and others to be determined in consultation with advisor.
- Environmental geology: Geol 601, 635, 636, 637; 9 hours from Geol 411, 435, 436, 445, 521, 559, 560, 590R (approved by graduate committee), PWS 511, Ch En 411, CE En 545, 550, 555, 641, 654, Hlth 454. Recommended: Stat 510, 511.
- Earth science education: Geol 697R (approved by graduate committee); 6-9 hours from Geol 411, 435, 440, 445, 451, 460, 480; 6 hours from IP&T 560, 564, 620, 652, 661.
- Any additional graduate courses in geology approved by graduate committee may be taken to satisfy remainder of 24 course work hours

Publishable thesis.

Examinations: (A) comprehensive oral examination on course work; (B) final oral defense of thesis.

### FINANCIAL ASSISTANCE

New graduate students are eligible for departmental scholarships, tuition scholarships, and teaching or research assistantships on a competitive basis.

Most regular degree-seeking students receive some form of financial aid. However, none may expect financial assistance from the department for more than four semesters.

Graduate students are also encouraged to seek additional support from industries and agencies outside the Department of Geological Sciences. *Note: Such requests must be submitted to the department chair, who will forward them with a supporting letter.*

## RESOURCES AND OPPORTUNITIES

The Department of Geological Sciences is in the Eyring Science Center which contains state-of-the-art computer resources, office space for graduate assistants, and modern laboratories. Our lab facilities house extensive and specialized instrumentation and mineral, rock, and fossil collections. The location of the university campus on the Wasatch Front near the juncture of the Rocky Mountains, the Colorado Plateau, and the Great Basin provides an incomparable natural laboratory for geology studies. The Department of Geological Sciences utilizes this natural setting, and the many geologic problems that remain in it to be studied, as one of our main assets.

The department is well equipped for graduate research in geology. A partial list of research equipment available includes: a wavelength dispersive electron microprobe (Cameca SX-50), two stable isotope ratio mass spectrometers, X-ray fluorescence spectrometer, atomic absorption spectrophotometers, a gradient elution ion chromatograph, a powder X-ray diffractometer, an atomic force microscope, ICP-OES, a cathodoluminescence microscope, a fluid inclusion heating and freezing stage, a core plug porosimeter/permeameter, two liquid scintillation counters, 3D subsurface mapping software, high-resolution GPS,

Worden gravimeters, proton precession magnetometers, a ground-penetrating radar system, a twenty-four-channel seismic system and portable energy source, variable offset electrical resistivity equipment, and a core lab porosity/permeability analyzer. A new 12-foot stream table has just been acquired to enhance teaching and research. Additional research facilities include the following:

The **Museum of Paleontology** includes exhibits, preparation laboratories, and fossil collections. Exhibits ranging from minerals to invertebrate and vertebrate fossils are open to the public and are an integral part of many courses. Collections are primarily from the intermountain region and include extensive assemblages of Late Jurassic and Early Cretaceous dinosaurs, Cenozoic vertebrates, and the Tidwell paleobotany collection, all of which provide research opportunities for faculty and students. Unrivaled field equipment and preparation laboratories support ongoing research projects.

The **Fission Track Dating Laboratory** provides student and faculty researchers with the geochronological potential to solve problems in stratigraphy and structural geology, to determine rates of uplift and thus aid in thermal modeling, and to provide support for numerous other faculty and student research projects where dating of events is necessary.

The **Geophysics Laboratory** supports research work in exploration, environmental, and engineering geophysics by housing seismic, ground-penetrating radar, electrical resistivity, and gravity, magnetic, and electromagnetic instrumentation, as well as computer support systems.

The **Hydrogeochemistry Laboratory** supports research programs in hydrology, environmental geology, economic geology, and petrology.

In addition, the lab is used in teaching modern analytical techniques in upper-division undergraduate and graduate courses. Groundwater composition, migration, and pollution have been major emphases of research.

The **Isotope Laboratory** supports faculty, graduate, and undergraduate research by providing for analysis of stable isotopes of H, C, N, and O, as well as  $^{14}\text{C}$  and  $^3\text{H}$ . Analysis of H and O isotopes in water is fully automated. Hydrology, paleohydrology, paleoclimatology, and economic geology are currently major areas of research and teaching supported by this laboratory.

The **Mineral Surface Chemistry Laboratory** supports research on low-temperature chemical reactions that occur at the interface between mineral surfaces and aqueous solutions. The lab includes an atomic force microscope, a surface-area analyzer, and wet chemical facilities. Computer equipment and software are also available for molecular modeling.

The **Sedimentology/Stratigraphy Laboratories** support studies in stratigraphy, clastic and carbonate rocks, and micropaleontology. Analytical equipment to map and characterize both surface and subsurface reservoir-quality rocks, to resolve complex stratigraphic problems, and to understand diagenesis in sedimentary rocks is available to students and faculty. Studies conducted in the labs have emphasized fluid flow and migration of both hydrocarbons and water, as well as detailed sequence stratigraphic modeling.

The **Structure and Tectonics Laboratory** supports research of orogenic processes and associated Natural Hazards. Projects of orogenic processes include investigations of channel flow in the Himalaya and active arc-continent collisions, geodetic studies of plate boundary

reorganization in the Indonesian region and the northern Rockies seismic belt, ophiolite genesis and emplacement, collisional melange genesis, rock versus surface uplift rates, finite difference modeling of paleo-tsunami in Indonesia, structural studies of Sevier and Basin and Range deformational features, climate versus tectonics in SE Asia, and studies of paleo-seismic records in lake sediments.

The **Ina Solar System Image Laboratory** provides resources for studies of planetary surfaces from spacecraft imaging. Current studies include dunes, mountains, rivers, lakes, and cryovolcanoes on Saturn's moon Titan, volcanism and tectonism on Jupiter's moon Io, and lunar volatile processes. Facilities include two MacPro machines and a PC with image processing software, including the USGS program ISIS, ArcGIS, ArcMap, Adobe Photoshop, Illustrator and similar programs. A central server provides storage, integration and security, and 42" printer can produce posters for conferences and prints for research and outreach.

Faculty research interests currently include the following: the geodynamic evolution of active arc-continent collision (structural features, uplifted synorogenic deposits and coral terraces, the GPS velocity field, and climate feedbacks); investigations of subsurface geology using seismic, gravity, and magnetic methods; composition of thermal waters; paleohydrology, paleoclimatology, and hydrogeology of arid and semiarid regions; petrogenesis of alkaline, mafic magmas; the origin of granitic magmas; mineral surface structure and chemistry; crystallography and crystal chemistry of silicate minerals; studies of Cenozoic magmatism and tectonism in the western United States; correlation of volcanic ash beds in western North America; origins of gold,

platinum, copper, and molybdenum deposits; tungsten skarns; reservoir characterization and sequence stratigraphy; Carboniferous-Permian conodont biostratigraphy; Jurassic and Cretaceous dinosaurs and paleoenvironments, Morrison and Cedar Mountain formations, vertebrate dinosaur taphonomy, glaciology, glacial paleoclimatology, aeolian processes and planetary geology.

## COURSE DESCRIPTION

### GEOL

#### **500.(Geol-Chem-C S-Math-MthEd-Phscs-Stat) Business Career Essentials in Science and Math. (1.5)**

Introduction for science, math, and statistics majors to careers in industry. Project planning, oral and written business presentations, business accounting, and technology readiness.

#### **504R.Global Geology Field Studies. (1-3)**

Prerequisite(s): Any senior-level geology course; instructor's consent.

In-depth study of classic geologic localities, such as Hawaii, the Bahamas, and the Appalachians, preliminary to on-site field study.

#### **521.Borehole Geophysics and Geology. (3)**

Prerequisite(s): Instructor's consent.

Applied well log analysis, including conventional and new techniques. Subsurface geology and lithology determined from many logs. Determining porosity, permeability, and fluid saturation with hydrology, and hydrocarbon applications.

#### **525.Petroleum Systems Analysis. (4)**

Prerequisite(s): Geol 370 or equivalent.

Properties of petroleum; exploration methods; generation and migration of hydrocarbons, reservoirs, traps, and seals; sedimentary basin classification; energy resources. Extended field trip required.

#### **530.Geological Communications Laboratory. (3)**

Prerequisite(s): Instructor's consent; graduate status.

Designing and creating a variety of student-selected geological illustrations emphasizing maps and cross-sections.

#### **531.Geoscience Data Analysis. (3)**

Prerequisite(s): Stat 121 or equivalent.

Basic scientific computing skills in MATLAB, and application of statistical and numerical modeling techniques to geoscientific problems.

#### **535.Contaminant Hydrogeology. (3)**

Prerequisite(s): Geology 435 or equivalent.

Principles, tools, and applications used to solve heavy metal, organic, and radionuclide groundwater contamination problems. Topics include regulations, mass transport, multiphase flow, transformation, retardation, and attenuation.

#### **540.Principles of Glaciology. (3)**

Geophysical problems involving ice in the environment and its role in global change. Topics include atmospheric ice, snow pack, glaciers, ice sheets, sea ice, permafrost, and ice age theories.

#### **545.Isotope Geochemistry-High Temperature Applications. (3)**

Prerequisite(s): Geol 352 or equivalent.

Use of stable and radioactive isotope systematics in geochronology in investigation of the origins of igneous and metamorphic rocks and in the study of tectonics.



**546.Isotope Geochemistry-Low Temperature Applications. (3)**

Prerequisite(s): Geol 445 or equivalent.

Use of stable, radioactive, and radiogenic isotope systematics in geochronology and in investigation of the origins of fluid, sediment, and organic matters in low temperature settings.

**550.Environmental Soil Chemistry. (3)**

Prerequisite(s): Chem 105, 106, 107; or equivalents.

Chemistry of soil systems at macroscopic and microscopic scales, examined from the perspective of scientists interested in environmental assessment and remediation.

**551.Advanced Mineralogy. (3)**

Prerequisite(s): Geol 351 or equivalent.

Crystallography, structure, and crystal chemistry of major silicate mineral groups.

**552.Igneous Petrology. (3)**

Prerequisite(s): Geol 352 or equivalent.

Origin and evolution of magmas, emphasizing trace element and isotopic compositions and intensive properties as calculated from mineral compositions.

**553.Metamorphic Petrology. (3)**

Prerequisite(s): GEOL 352

Principles of metamorphism, including chemical equilibrium and thermodynamics of metamorphic reactions, geothermobarometry, origin and interpretation of zoned metamorphic minerals, pressure-temperature paths, and metamorphism of pelites, mafic, ultramafic and carbonate rocks. Additional subjects based on interest of the students.

**555.Volcanoes and Ore Deposits. (1-3)**

Prerequisite(s): Geol 352 or equivalent.

Examination of the role of volcanic rocks and processes in the generation of ore deposits.

**560.Reflection Seismology Theory (3)**

Prerequisite(s): Instructor's consent.

Principles, tools, and methods used in seismic geophysics, with exploration, engineering, environmental, and hydrological applications.

**561.Geophysical Field Methods. (3)**

Prerequisite(s): Instructor's consent.

Geophysical data acquisition processing and computer-assisted interpretation, emphasizing field deployment techniques, use of commercial data processing, and visualization software.

**565R.Special Topics in Geology. (0.5-4)**

Prerequisite(s): Instructor's consent.

The following topics may be offered on demand: geology for teachers, ore deposits, solid-water interface chemistry, X-ray crystallography.

**574.Advanced Stratigraphy. (3)**

Prerequisite(s): Geol 370 or equivalent.

Studying the stratigraphic record through modern methods of correlating stratal packages, emphasizing concepts of sequence and seismic stratigraphy, and utilizing methods of chronostratigraphy, biostratigraphy, lithostratigraphy, and absolute dating. Extended field trip required.

**575.Advanced Structural Geology. (3)**

Prerequisite(s): Geol 375, 410; or equivalents.

In-depth discussions of a variety of topics in structural geology, emphasizing current literature and problems.

**576.Three-Dimensional Subsurface Mapping and Evaluation. (3)**

Prerequisite(s): GEOL 476

Advanced interpretation of 3D seismic reflection data. Integrating well and seismic data to interpret complex geologic systems. Implications for understanding hydrocarbon reservoirs.

**586.Vertebrate Paleontology. (4)**

Prerequisite(s): Instructor's consent.

Paleobiology, osteology, and phylogeny of the vertebrates. Field trips required. Lab studies.

**590R.Short Courses. (1-3)**

Short graduate-level courses offered on a random basis.

**591R.Seminar. (0.5)**

Seminar on various geologic topics by guest speakers.

**592R.Career Pathways Seminar. (0.5)**

Seminar on graduate school and career opportunities by guest speakers.

**599R.Academic Internship. (1-9)****601.Planet Earth. (3)**

Prerequisite(s): Undergraduate degree.

Rigorous review of the fundamentals of geology, including Earth's origin and the evolution of the major geologic systems. Field trips.

## GEOLOGICAL SCIENCES

### 606.Paleoclimatology. (3)

Prerequisite(s): Instructor's consent.

Quaternary geochronology and stable isotope fundamentals followed by survey of major paleoclimate proxy records. Quantitative methods emphasized where appropriate.

### 621.Petrophysics and Reservoir Characterization. (3)

Prerequisite(s): GEOL 521

Advanced use of well log tools combined with direct (core) or analog (outcrop) lithologic information to characterize underground petroleum or groundwater reservoirs.

### 635.Advanced Hydrogeology. (3)

Prerequisite(s): Geol 435 or instructor's consent.

Equations governing fluid flow through saturated porous media under various geologic conditions; applying hydraulic characteristics to analysis of well and aquifer conditions.

### 636.Hydrogeochemistry. (3)

Prerequisite(s): Geol 445 or instructor's consent.

Nature and origin of solutes and isotopes in groundwater systems. Applying geochemistry to evaluation of groundwater recharge conditions and flow patterns.

### 666.Instrumental Methods. (3)

Prerequisite(s): Geol 351, 352; or equivalents.

Use of instrumentation for determining mineralogical, chemical, and isotopic composition of geological materials.

### 671.Sedimentary Petrology--Carbonate Rocks. (3)

Prerequisite(s): Geol 370 or equivalent.

Characteristics and significance of limestones and dolomites.

### 672.Sedimentary Petrology--Clastic Rocks. (3)

Prerequisite(s): Geol 370 or equivalent.

Characteristics of conglomerates, sandstones, and shales. Provenance studies of various terrains by thin section analysis. Extended field trip required.

### 695R.Research. (1-4)

### 696R.Readings and Conferences in Geology. (1-4)

### 697R.Directed Field Studies. (1-6)

### 699R.Master's Thesis. (1-9)

## FACULTY

**Bickmore, Barry R.** *Professor*, PhD, Virginia Polytechnical Institute and State University, 1999. Low Temperature Geochemistry; Mineral Surface Chemistry; Water-Rock Interactions

**Britt, Brooks B.** *Associate Professor*, PhD, University of Calgary, Canada, 1993. Vertebrate Paleontology; Taphonomy

**Carling, Gregory T.** *Assistant Professor*, PhD, University of Utah, 2012. Hydrogeology; Engineering Geology; Hydrogeochemistry

**Christiansen, Eric H.** *Professor*, PhD, Arizona State University, 1981. Petrology; Volcanology

**Dorais, Michael J.** *Research Professor*, PhD, University of Georgia, 1987. Igneous Petrology; Electron Microprobe Analysis

**Harris, Ron** *Professor*, PhD, University of London, England, 1989. Structure; Tectonics; Mountain-Building Processes

**Keith, Jeffrey D.** *Professor*, PhD, University of Wisconsin, 1982. Economic Geology; Geochemistry

**Kowallis, Bart J.** *Professor*, PhD, University of Wisconsin, Madison, 1981. Geologic Mapping; Geochronology

**McBride, John H.** *Professor*, PhD, Cornell University, 1987. Exploration Geophysics; Tectonics

**Morris, Thomas H.** *Professor*, PhD, University of Wisconsin, Madison, 1986. Sedimentology; Stratigraphy; Clastic Petrology

**Nelson, Stephen T.** *Professor*, PhD, University of California, Los Angeles, 1991. Isotope Geochemistry; Environmental Geology

**Radebaugh, Jani** *Associate Professor*, PhD, University of Arizona, 2005. Planetary Science; Volcanology

**Ritter, Scott M.** *Professor*, PhD, University of Wisconsin, Madison, 1986. Invertebrate Paleontology; Carbonate Petrology

**Rupper, Summer B.** *Associate Professor*, PhD, University of Washington, 2007. Paleoclimatology; Glaciology

## HEALTH SCIENCE

**Chair:** Barnes, Michael D.

**MPH Director:** Hanson, Carl L.

2049 LSB, Provo, UT 84602-2115

(801) 422-9103

<http://mph.byu.edu>

### THE PROGRAMS OF STUDY

The mission of public health is to assure the health and well-being of populations. It is the science and art of preventing disease, prolonging life, and promoting health and efficiency through organized research and interventions. The purpose of the graduate program is to prepare students to be leaders in public health and health promotion.

Curricula in the MPH program prepares students to work with underserved and at-risk populations in various settings.

Health promotion professionals are trained in: epidemiology and biostatistics, community health analysis, health-related behavior and the behavior change process, educational processes, program planning, implementation and evaluation, environmental health, research, administration, health communication and social marketing, community mobilization, international health practice and policy advocacy.

One graduate degree is offered through the Department of Health Science: the Master of Public Health-MPH.

#### **Public Health - MPH**

The most recognized professional credential in public health practice and leadership, the Master of Public Health (MPH) is a practice-based degree that enables students to gain knowledge basic to public health. The MPH program at BYU prepares students to function as public health professionals in government,

nonprofit, healthcare, and other settings; and provide leadership in the field of public health.

The average length of time required to complete the MPH program is two years, depending on course load and previous academic training or professional activity.

#### **Requirements for Degree. (Effective Fall 2014)**

- Credit hours (48): 36 hours of required courses; 6 hours of elective credits; 6 hours of field experience (300 contact hours).
- Required core courses: HLTH 600, 602, 604, 606, 607, 608, 612, 614, 615, 618, 635.
- Requirements for the field experience are determined by the student's graduate committee and are based on prior education, experience, and present professional interests.
- Examinations: certification exam (Certified in Public Health), oral exam, field experience written report.

### FINANCIAL ASSISTANCE

Graduate teaching or research assistantship positions may be available for qualified students. Additional scholarships and awards are available on a competitive basis at the college and university levels.

### RESOURCES AND OPPORTUNITIES

The Department of Health Science is housed in the Life Sciences Building. Students have access to graduate study labs and computer labs that house approximately 45 computers equipped with a range of software including MS Office, Internet Explorer, SAS, SPSS, and other course-specific software.

The labs also have printers and televisions with VGA and audio connections.

Most key public health journals are available to MPH students at the Harold B. Lee Library, the third best university library in the nation. Students have access to a departmental research and technology lab for research or other projects.

*For a more detailed description of the graduate program requirements, send for a copy of the department's MPH brochure.*

### COURSE DESCRIPTION

#### **HLTH**

#### **600. Foundations of Public Health and Health Promotion. (3)**

Global perspectives of public health and health promotion. Essential public health services, public health organizations, and current issues in global health promotion.

#### **602. Principles of Epidemiology. (3)**

Principles and methods used in epidemiologic research, including study design, confounding, chance, bias, causality, and descriptive and analytic methods.

#### **603R. Special Topics in Public Health. (1-7)**

Seminar exploring current global health issues.

#### **604. Principles of Biostatistics. (3)**

Basic concepts of biostatistics and their applications and interpretation. Topics include descriptive statistics, graphics, diagnostic tests, probability distributions, inference, regression, and life tables.

#### **606. Environmental Health Sciences. (3)**

Environmental risks for human disease. Contributions of physical and biological factors and social, economic, and political determinants relative to sustainable development and promotion of health.

## 607.Public Health Administration. (3)

Application of management and leadership skills in public health organizations. Includes systems thinking, developing shared visions, planning, communication, staffing, directing, finance, budgeting, and reporting.

## 608.Determinants of Health Behavior. (3)

Psychological, social, and cultural determinants of health behavior. Introducing health behavior theories and applying behavior change models to program development.

## 612.Program Planning and Evaluation. (3)

Various program planning and implementation methods, theories, and skills, including needs assessment, priority setting, program development, evaluation and budgeting.

## 618.Survey and Research Methods. (3)

Designing, administering, and analyzing data collection instruments for research and evaluation in public health. Quantitative and qualitative methods.

## 619.Infections and Chronic Disease Prevention and Control. (3)

Public health solutions to the leading causes of chronic and infectious disease mortality in the United States and the world.

## 625.Population-Based Health Promotion Interventions. (3)

Macro- or population-based interventions, including mass communication, policy and legislation, media advocacy, social marketing, and community mobilization.

## 630.Small-Group Health Promotion Interventions. (3)

Micro-interventions: curriculum and the educational process, group dynamics, training models, consultation, and counseling, including theories used in health education and adult learning.

## 635.International Health Practice. (3)

Uses principles learned in core public health courses to develop skills in collaborating and partnering with international entities to impact health among populations with diverse cultural values, traditions, and geopolitical systems.

## 655.Critical Health Behaviors and Risks in Public Health. (3)

Prerequisite(s): Be in second year of study.

Team-taught seminar addressing six critical health behaviors and related risks pertaining to tobacco use, alcohol and drug use, injury and violence, nutrition, physical activity, and sexual risk behaviors.

## 688R.Field Experience. (1-6)

Prerequisite(s): HLTH 602 & HLTH 612 & HLTH 618; Hlth 600, Hlth 604, Hlth 608, Hlth 625.

Domestic U.S. and international field experiences in public health settings that expose students to public health strategies and interventions in multicultural settings.

## 691R.Mentored Research. (3-5)

Collaborating with graduate faculty of public health on mentoring grants or other health-related research and initiatives.

## 696R.Independent Studies. (0.5-3)

## FACULTY

**Barnes, Michael D.** *Professor*, PhD, Southern Illinois University, 1993. Health communication and social media; policy advocacy; family health

**Chaney, Robbie** *Assistant Professor*, PhD, University of Cincinnati, 2014. Health geography; urban bicycle safety; needs assessment; social determinants of health; health advocacy

**Cole, Eugene C.** *Professor*, DrPH, University of North Carolina, 1983. Environmental health, occupational health; risk assessment; biosafety; emerging and re-emerging infectious diseases; biowarfare agents; laboratory quality assurance; clinical, environmental, and genetic testing

**Crookston, Benjamin T.** *Assistant Professor*, PhD, University of Utah, 2009. Global health; maternal and child health; nutritional epidemiology; infectious disease epidemiology

**Hall, Cougar P.** *Assistant Professor*, PhD, University of Utah, 2008. Social norm approaches in school health education; student-teacher quality indicators; school health and community partnerships

**Hanson, Carl L.** *Associate Professor*, PhD, Southern Illinois University, 1994. Health communication and social media; family health; adolescent health

**Johnston, James D.** *Assistant Professor*, PhD, University of Utah, 2010. Children's environmental health; infectious disease transmissions and prevention; occupational safety and health



**Lindsay, Gordon B.** *Professor, PhD,* Ohio State University, 1984. Substance abuse prevention; community health promotion

**Magnusson, Brianna M.** *Assistant Professor, PhD,* Virginia Commonwealth University, 2011. Reproductive epidemiology; unintended pregnancy; contraceptive use; social and environmental factors affecting sexual and reproductive health

**Merrill, Ray M.** *Professor, PhD,* Arizona State University, 1994. Cancer epidemiology; impact of advances in cancer treatment and screening tests; impact of various biases on cancer statistics

**Neiger, Brad L.** *Professor, PhD,* University of Utah, 1991. Social marketing and social media applications in public health settings

**Novilla, M. Lelinneth** *Associate Professor, MD,* University of the City of Manila, 1990. Family health and involving the family in health promotion; social determinants of health economics; health risk behavior; chronic diseases

**Page, Randy M.** *Professor, PhD,* Southern Illinois University, 1982. Adolescent health; substance abuse; global health promotion

**Sloan, Chantel D.** *Assistant Professor, PhD,* Dartmouth College, 2009. Medical geography, respiratory syncytial virus, asthma and cancer epidemiology, air pollution

**Thacker, Evan L.** *Assistant Professor, PhD,* University of Washington, 2011. Health of older adults, neurological health, cognitive function, cardiovascular health

**Thackeray, Rosemary** *Professor, PhD,* University of Utah, 2000. Social marketing; technology; women's health

**Thygerson, Steven M.** *Assistant Professor, PhD,* Colorado State University, 2006. Occupational health and safety; injury prevention

**West, Joshua** *Assistant Professor, PhD,* University of California, San Diego, 2008. Application of theory-driven interventions to improve parenting practices and decrease adolescent drug use

## INFORMATION SYSTEMS

**Chair:** Romney, Marshall B.  
**Graduate Coordinator:** Anderson, Bonnie B.

790 TNRB, Provo, UT 84602  
(801) 422-5602

[mism@byu.edu](mailto:mism@byu.edu)

<http://marriottschool.byu.edu/mism/>

## THE PROGRAMS OF STUDY

The Information Systems Department administers one graduate program through the Marriott School: the Master of Information Systems Management-MISM.

The master of information systems management program offers a specialization in information systems and the application of information technology in business organizations based on a general background in business and accounting. The MISM degree is awarded at the completion of the professional program, which can begin as early as the senior year of the bachelor of information systems program and culminates in the Marriott School after the fifth year of study. Students who enter the MISM program with a baccalaureate degree in information systems can complete the program in two years or less.

The objective of the MISM program is to develop graduates who exhibit professionalism and are qualified with specialized knowledge in information system areas. The department seeks to educate individuals who are: (1) imbued with a strong sense of professional commitment, (2) qualified with specialized knowledge in the areas of information systems, (3) committed to continued professionalism beyond formal education, and (4) capable of becoming leaders who exhibit high standards of ethical conduct within their chosen profession.

The department admits approximately 60 students per year into its graduate program Information Systems Management - MISM.

### **Information Systems Management - MISM**

The MISM program is designed for students who want professional careers in information systems. Students seek employment with consulting firms, accounting firms, industrial organizations, and not-for-profit entities performing a variety of services, such as understanding the information needs of an organization, designing, developing, and implementing information systems to meet specified requirements, administering the information systems function, auditing an information system, and formulating an information systems master plan to effectively utilize information technology throughout an organization.

#### **Requirements for the MISM Degree.**

- Marriott School common requirements: Bus M 530, 540, 581, 582
- MISM requirements: IS 531, 550, 551, 552; 555, 560, 562; 21 elective hours from any approved MSM courses not already selected or from other courses as approved by the graduate program coordinator.

### **FINANCIAL ASSISTANCE**

The Information Systems Department utilizes the Marriott School's financial aid provisions. Qualified students can receive aid from the following: the Marriott School Scholarship Fund, private scholarship donations, assistantship awards, and loan assistance.

**Scholarships.** The Marriott School of Management offers scholarships to Marriott School students through the college, departments and programs. One application online at <http://marriottschool.byu.edu/scholarship/> allows students to apply for all scholarships the Marriott School offers.

**Assistantships.** Research and teaching assistantships are available for qualified second-year students.

**Loans.** Several loans are available for Marriott School students:

- Marriott School Loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU Short-Term Loans: available for up to the cost of tuition only.
- Federal Stafford Loans: subsidized by the U.S. government. Not available for international students.

More information on and applications for these loans are available from the BYU Financial Aid Office, A-153 ASB, (801) 422-4104, e-mail: [financial\\_aid@byu.edu](mailto:financial_aid@byu.edu).

### **RESOURCES AND OPPORTUNITIES**

**The N. Eldon Tanner Building.** The Tanner Building, which houses the Marriott School, is one of the finest facilities of its kind. The original building, with a dramatic seven-story atrium, was recently updated with a new four-story addition. The addition boasts thirty-nine team study rooms, six large case rooms, the Blue Line Deli, and adds 76,000 square feet to the existing building.

**The Marriott School of Management.** The Marriott School is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education

and training closer to management practice. This is accomplished, in part, through the Marriott School's National Advisory Council.

#### **National Advisory Council.**

Consisting of more than 160 prominent business and government executives, the National Advisory Council lends major support to the Marriott School. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

#### **The Executives on Campus Program.**

This program gives students an opportunity to interact with distinguished business and government leaders who come to campus. These executives visit classes and meet with student organizations as well as participate in the Executive Lecture Series and Entrepreneurship Lecture Series.

### **COURSE DESCRIPTION**

#### **IS**

##### **515.Spreadsheets for Business Analysis. (3)**

Prerequisite(s): IS 201 or equivalent.

Using spreadsheets to support business analysis and decision making. Includes sensitivity analysis, pivot tables, introductions to databases, and macros, charting, and similar topics.

##### **520.Business Programming and Spreadsheet Automation. (3)**

Prerequisite(s): IS 201 or equivalent or instructor's consent.

Programming in Excel Visual Basic; automating common tasks; retrieving data from web servers; building optimization models and user forms.

**531.Enterprise Infrastructure. (3)**

Prerequisite(s): Admission to MISM program; IS 404 or equivalent.

Principles of IT enterprise infrastructure management, including platform choices, functionality, cost, security, deployment, controls, flexibility, and adaptability.

**533.Advanced Data Communications. (3)**

Prerequisite(s): IS 404 or equivalent.

Design, management, and strategic use of local area networks (LANs), wide area networks (WANs), intranets, and the Internet to solve business problems.

**540.Spreadsheet and Database Automation Programming. (3)**

Prerequisite(s): IS 202 or C S 142; or equivalent; or instructor's consent.

Automating spreadsheets in Excel, interacting with password-protected web sites, writing code to conduct simulations, solving common database interface problems in Access, etc.

**542.Web Development. (3)**

Prerequisite(s): IS 403 or equivalent.

Web development techniques, including server-side and client-side processing, database integration, and advanced browser techniques.

**543.Mobile Platform Development. (3)**

Prerequisite(s): IS 413 or equivalent.

Principles of mobile platforms. Application development for mobile platforms such as smart phones and tablets. Emphasizing user experience and business analytics for management decisions.

**550.MISM Capstone Introduction. (0.5)**

Prerequisite(s): Final year in MISM.

Presentations by faculty and professionals to make students aware of latest developments in the field and help them prepare a capstone project proposal.

**551.Leading Change in a Technical Environment. (3)**

Prerequisite(s): Admission to a Marriott School graduate program.

Principles and skills of leading information technology-enabled organization change and system implementation. Topics include leadership, change management, ERP/CRM systems implementation, knowledge management, and business process redesign.

**552.MISM Capstone Project. (3)**

Prerequisite(s): Admission to MISM.

Development and completion of capstone project integrating information systems knowledge previously gained in the MISM program

**555.Data Mining for Business Intelligence. (3)**

Prerequisite(s): Admission to a Marriott School graduate program; introductory statistics.

Computation of business intelligence from data resources within modern organizations using data mining.

**560.Information Security Management. (3)**

Prerequisite(s): I Sys 404 or equivalent.

How technology, organizations, and people interact to create secure information systems. Topics include data encryption, physical security, information security policies, and security awareness and training.

**562.Project Management. (3)**

Prerequisite(s): Admission to a Marriott School graduate program.

Principles and skills of project management in an information systems context, including management of risk, schedule, scope, cost, quality control, communications, human resources, and procurement.

**565.Digital Forensics for Organizations. (3)**

Prerequisite(s): I Sys 404 or equivalent.

Digital forensics from an organizational perspective, covering the three functions of digital forensics performed by businesses: employee abuse investigations, incident response, and electronic discovery.

**571.Introduction to Academic Research in Information Systems. (3)**

Prerequisite(s): Admission to MISM program; instructor's consent.

Conducting academic information systems research, including philosophy of science, causality, validity, research proposal development, and research methods.

**572.Structural Equation Modeling. (3)**

Prerequisite(s): IS 571; Instructor's consent.

Science and theory; constructs and measurement; surveys and experiments; data screening; human subjects protocols (IRB); factor analysis; model fit; academic writing.

**590R.Seminar in Information Systems. (3)**

Special topics by announcement.

**590R.User-Centered Interface Design. (3)**

**590R.Windows.NET Programming. (3)**

**590R.ASP.NET Web Development. (3)**

**590R.Computer Forensics. (3)**

**590R.Network Administration. (3)**

## INSTRUCTIONAL PSYCHOLOGY AND TECHNOLOGY

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### **599R.Academic Internship: Information Systems.** (0.5-3)

Prerequisite(s): Admission to Marriott School graduate program; departmental consent.

Approved on-the-job experience. Applying classroom theory and technology to actual problems; exploring career opportunities; learning role of information systems in business environment.

### **693R.Readings and Conference.** (0.5-3)

Prerequisite(s): MISM director's consent.

In-depth study one-on-one with chosen professor on topic of mutual interest not currently covered in an existing course.

## FACULTY

**Albrecht, Conan** *Associate Professor*, PhD, University of Arizona, 2000. Distributed Group Support Systems; Computer-Aided Fraud Detection

**Allen, Gove** *Associate Professor*, PhD, University of Minnesota, 2001. Database Management; Conceptual Modeling

**Anderson, Bonnie B.** *Associate Professor*, PhD, Carnegie Mellon University, 2001. Information Systems; Change Management

**Dean, Douglas L.** *Associate Professor*, PhD, University of Arizona, 1995. Systems

**Liddle, Stephen W.** *Professor*, PhD, Brigham Young University, 1995. Software Development; Data Extraction; Conceptual Modeling

**Meservy, Rayman D.** *Associate Professor*, PhD, University of Minnesota, 1985. Audit; Information Systems

**Romney, Marshall B.** *Professor*, PhD, University of Texas, Austin, 1977. Accounting Information Systems; Fraud

**Vance, Anthony** *Assistant Professor*, PhD, Georgia State University, 2009. Information Security; Trust and Information Systems; Internal Control

## INSTRUCTIONAL PSYCHOLOGY AND TECHNOLOGY

**Chair:** Graham, Charles  
**Graduate Coordinator:** Yanchar, Stephen

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(801) 422-5097  
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<http://education.byu.edu/ipt>

## THE PROGRAMS OF STUDY

Instructional Psychology and Technology is a branch of educational study concerned with the ideas, principles, and theories related to the improvement of learning. Students of instructional psychology and technology seek to identify and implement improvements in instruction while endeavoring to understand the principles that govern these improvements. These solutions are implemented in educational settings in public schools and universities, business, industry, the government, the military, the community, and the church.

The objective of the Department of Instructional Psychology and Technology is to enhance learning by improving instruction and teaching. In partnership with others, the department will (1) search for knowledge that improves instruction, (2) apply knowledge and technology to solve instructional problems, and (3) empower students with knowledge and skills in instructional development, research, evaluation, and measurement.

Students in each degree program are required to take basic courses in the following areas of disciplined inquiry in instruction: design and development, research, measurement, and evaluation. They are also required to acquire collateral tools from other disciplines such as statistics, computer science, human resource management, and communications. Specialized courses are offered to deepen the candidate's



knowledge and theoretical sophistication. Professional skills are developed through extensive project and internship experiences offered in the schools, church, home, and community.

The Department of Instructional Psychology and Technology offers two degrees: Instructional Psychology and Technology-MS and Instructional Psychology and Technology-PhD.

Approximately thirty students are enrolled in the MS program and fifty students in the PhD programs. Full-time MS students should be able to complete an MS degree within approximately two years; full-time PhD students with an MS in instructional psychology and technology should be able to complete the PhD within three years.

Master's and doctoral students in other departments wishing to take a minor in Instructional Psychology and Technology should counsel with the instructional psychology and technology faculty member appointed to their graduate committee in selecting the appropriate courses (9 hours of course work required for a master's minor, 12 hours for a doctoral minor).

### ***Instructional Psychology and Technology - PhD***

The PhD program prepares students to assume positions of leadership in instructional design and evaluation. Graduates may take positions as faculty at colleges and universities, direct other instructional designers in private or public institutions, or work as an individual consultant.

The instructional psychology and technology doctoral program is designed for full-time study. All PhD students will be required to complete the equivalent of 9 credit hours each fall and winter semester to remain enrolled in the program.

#### **Requirements for Degree.**

- Credit hours (minimum 72): 54 course work hours plus 18 dissertation hours (IP&T 799R).
- Prerequisite (3 hours): IP&T 515R - Academic Writing and Argumentation, or ENGL 316.
- Skills courses (15 hours): IP&T 629, 650, 651, 656, plus 3 hours from the following: CS-Cpln 100, IP&T 560, 760, Chum 281, or Chum 287.
- Required (core) courses (16 hours): IP&T 520, 564, 620, 652, 661.
- Specialization: 18 hours as determined in consultation with graduate committee.
- Advanced course work: 6 hours of advanced course work (e.g., IP&T 692R special topics or other advanced courses).
- Internship: 6 hours (IP&T 599R).
- Seminar: 2 hours (IP&T 690R).
- Two projects: 6 hours.
- Residence: the equivalent of 9 credit hours each fall and winter semester.
- Examinations: (A) comprehensive written examination; (B) oral defense of dissertation.
- Time limit: all requirements for the doctorate must be completed within an eight-year period.

### ***Instructional Psychology and Technology - MS***

The MS program prepares students to assume professional positions in instructional design and evaluation or to pursue a doctorate in these fields. All MS students will be required to complete at least 6 credit hours each fall and winter semester to remain enrolled in the program.

#### **Requirements for Degree.**

- Credit hours (minimum 36): 30 course work hours plus 6 thesis hours (IP&T 699R) or 6 project hours (IP&T 698R).

- Prerequisite (3 hours): IP&T 515R-Academic Writing and Argumentation, or ENGL 316.
- Required courses (19 hours): IP&T 520, 560 or 651, 564, 629, 652, 661.
- Emphasis: 7 hours to be determined in consultation with graduate committee.
- Internship: 3 hours (IP&T 599R).
- Seminar: 1 hour (IP&T 690R).
- Thesis: 6 hours (IP&T 699R); or project: 6 hours (IP&T 698R).
- Examinations: oral defense of thesis or project.

### **FINANCIAL ASSISTANCE**

Financial assistance is available mainly in the form of paid internships through the Instructional Psychology and Technology Department, other departments within the university, and various agencies external to the university. Limited funds are available for partial tuition scholarships for students with emergency financial needs. Other financial aid is available through the university.

### **RESOURCES AND OPPORTUNITIES**

Instructional Psychology and Technology utilizes the David O. McKay Education Building for the majority of its classrooms and resource centers.

The school and department provide extensive computer and multimedia facilities for student use. Macintosh and Windows computers are available in various computer laboratories. Most of these computers are connected to the university broad-band network, which provides convenient access to a large number of computer-based software tools, such as SPSS and SAS statistical analysis programs, and extensive online library research tools.

*For a more detailed description of the graduate program requirements, see the department Web site at <http://education.byu.edu/ipt>*

## INSTRUCTIONAL PSYCHOLOGY AND TECHNOLOGY

### COURSE DESCRIPTION

#### **IP&T**

#### **514R.Special Topics in Instructional Psychology.** (0.5-3)

Topics vary. Topics may include technical applications, effective teaching, student assessment.

#### **514R.Technical Applications.** (0.5-3)

#### **514R.Effective Teaching.** (0.5-3)

#### **515R.Special Topics in Instructional Psychology and Technology.** (0.5-3)

#### **515R.Evaluating Student Learning.** (0.5-3)

#### **515R.Program Evaluation.** (0.5-3)

#### **515R.Instructional Techniques in Teaching.** (0.5-3)

#### **515R.Tutoring Children in Reading.** (2)

#### **515R.Scholarly Writing and Argumentation.** (3)

A prerequisite course designed to help improve students' scholarly writing and argumentation. Students work together to strengthen their skills in these areas by analyzing sources from the scholarly literature, completing writing assignments, offering feedback on other students' work, receiving feedback on their own, and completing a course project.

#### **520.Foundations of Instructional Technology.** (3)

Introduction to instructional psychology and technology theory and practice: psychological foundations of human performance technology and learning sciences. Current research issues, professional organization of the field, and ethical issues.

#### **560.Instructional Product Development.** (3)

Designing, programming, and debugging a learning product using a high-level computer language.

#### **564.Instructional Design.** (3)

Identifying instructional problems; specifying objectives, instructional strategies, and media; analyzing learning outcomes; developing instructional materials and assessment instruments; validating instructional systems.

#### **599R.Academic Internship.** (0.5-6) Prerequisite(s): Departmental consent.

#### **620.Principles of Learning.** (3)

Improving classroom learning through understanding underlying psychological principles and theories.

#### **629.(IP&T - CPSE) Introduction to Research.** (3)

Introduction to the design options available for conducting basic and applied research and how to read and write research reports. Quantitative, qualitative, and mixed methods along with ideas for protecting human subjects are discussed.

#### **638.Research in Blended and Online Learning Environments.** (3)

Introduction to major research problems, questions, and theories that have been investigated in blended and online learning. Exploration of current inquiry questions and methods used to conduct research in blended and online learning environments.

#### **651.(IP&T - CPSE) Statistics 1: Foundations.** (3)

Emphasis on conceptual understanding and practical application of descriptive and basic inferential statistics to decision making.

#### **652.Assessing Learning Outcomes.** (4)

Selecting and constructing instruments and procedures for assessing affective, behavioral, and cognitive outcomes of education.

#### **653.(IP&T - CPSE) Qualitative Research 1 (Intro to Qualitative Research).** (3)

Prerequisite(s): IP&T 629

Provides an introduction to qualitative inquiry in education, emphasizing major assumptions of qualitative research, a survey of prominent qualitative approaches, differences between various qualitative approaches and more traditional qualitative strategies, and practice with basic qualitative research skills such as interviewing, transcription, data analysis, and report writing.

#### **654.Computers in Educational Measurement.** (0.5-4)

Prerequisite(s): IP&T 652 or instructor's consent.

Types of computerized measurement and assessment methods and item forms, as well as their development, delivery, and statistical theory.

#### **655.Instructional Print Design and Production.** (2)

Applying instructional and visual design principles to produce instructional print materials, using computer-based tools.

#### **657R.Measurement Project.** (0.5-3)

Prerequisite(s): IP&T 652, Stat 510; or equivalents.

Designing, conducting, and reporting a comprehensive measurement project.

#### **661.Introduction to Evaluation in Education.** (3)

Introduction to the nature, purposes, and functions of educational evaluation in making judgments about teachers, instructional materials, academic programs, curricula, and school systems.

**664.Advanced Instructional Design.** (3)

Prerequisite(s): IP&T 564

Advanced laboratory in instructional system design, production, formative evaluation, packaging, and implementation. Systematic critical analysis of all phases of development.

**665.Instructional Visual/Video Production.** (4)

Designing, producing, and integrating audio, visual, and video instructional materials. Applying digital and other technologies in audio recording and mixing, and photographic and video production.

**667R.Evaluation Project.** (0.5-3)

Prerequisite(s): IP&T 661

Designing, conducting, and reporting a comprehensive project in evaluation.

**674R.Quasi-Experimental Studies.** (0.5-3)

**677R.Research Project.** (0.5-3)

Designing, conducting, and reporting a comprehensive project in research.

**682.Project and Instructional Resource Management.** (3)

Managing research, development, and evaluation projects in public schools and higher education. Planning, budgeting, supervising, managing personnel, and scheduling.

**687R.Development Project.** (0.5-3)

Prerequisite(s): IP&T 564

Designing, conducting, and reporting a comprehensive project in development.

**690R.Seminar.** (0.5-3)

**692R.Advanced Topics.** (0.5-3)

**693R.Directed Individual Study.** (0.5-3)

Prerequisite(s): Instructor's consent.

**698R.Master's Project.** (0.5-6)

**699R.Master's Thesis.** (0.5-6)

**730.(IP&T - CPSE) Hierarchical Linear Modeling.** (3)

Prerequisite(s): IP&T 651 & IP&T 745

Conceptual and applied processes in hierarchical linear modeling with cross sectional nested data and longitudinal repeated measures data.

**745.(IP&T - CPSE) Statistics 2: Multiple Regression.** (3)

Prerequisite(s): IP&T 629 & IP&T 651

An examination of multiple regression as an inferential statistical procedure in its own right and as a foundation for subsequent courses in structural equation modeling, path analysis, and factor analysis.

**747.(IP&T - CPSE) Structural Equation Modeling.** (3)

Prerequisite(s): IP&T 651 & IP&T 745

Examination of Structural Equation Modeling with expressions in Path Analysis, Confirmatory Factor, and Latent Variable Modeling.

**750.Literature Review and Synthesis.** (3)

Prerequisite(s): IP&T 629 and selection of research topic.

Strategies, methods, and habits for writing and publishing effective critical literature reviews. Students must already have a research topic selected, defined narrowly enough to do meaningful inquiry, and approved by their advisor before taking the course.

**752.Measurement Theory.** (3)

Prerequisite(s): IP&T 651 & IP&T 652

Classical and modern models for measuring human attributes. Issues related to reliability, validity, item selection, scoring, standard setting, and test equating. Use of item response theory and generalizability theory.

**753R.(IP&T - CPSE) Qualitative Research 2 (Advanced).** (3)

Prerequisite(s): IP&T 653

An in-depth exploration of qualitative research approaches and data analyses. Options include AR/PAR/Self-Study/Narratives; Hermeneutics, Phenomenology; Ethnography/Case Study; Grounded Theory; emerging methods.

**754.Item Response Theory.** (3)

Prerequisite(s): IP&T 752

Concepts, models, and assumptions in IRT, including trait and parameter estimation, scale properties, assessment of model fit, and the use of computer software. Emphasizes applications of IRT to practical testing problems including test construction and revision, adaptive testing, differential item functioning, score equating, vertical scaling, and model-based diagnostic assessment.

**760R.Advanced E-Learning Development.** (3)

Prerequisite(s): IP&T 560

Team-based development of an instructional product for a local client.

**761.Advanced Evaluation in Education.** (3)

Prerequisite(s): IP&T 661

Assumptions, theories, practices, and problems associated with educational evaluation.

**789.(IP&T - CPSE) Meta Analysis.**  
(3)

Prerequisite(s): IP&T 629 & IP&T 651

An overview of qualitative research synthesis, methods for systematic literature reviews and meta-analysis. A balanced approach between conceptualization and application with practice using existing data sets and statistical packages.

**790R.Advanced Seminar.** (0.5-3)

**799R.Doctoral Dissertation.** (0.5-9)

Prerequisite(s): Completion of skill and project requirements.

Formal report and defense of a substantive research topic designed to make an original contribution to knowledge in the field.

**FACULTY**

**Bush, Michael D.** *Associate Professor*, PhD, Ohio State, 1983. What Computers can do to Enrich Learning and Provide Access to Information

**Davies, Randall S.** *Assistant Professor*, PhD, Brigham Young University, 2002. Program Evaluation & Assessment; Technology Integration; Educational Data Mining & Learning Analytics

**Gibbons, Andrew S.** *Professor*, PhD, Brigham Young University, 1974. Design Theory; Design Languages; Instructional Simulation

**Graham, Charles R.** *Professor*, PhD, Indiana University, 2002. Blended and Online Learning; Technology-Mediated Teaching and Learning

**Larsen, Ross A.** *Assistant Professor*, PhD, Texas A&M, 2014. Common Methodological Social Science Issues and Comprehensive Structural Equation Modeling

**Rich, Peter J.** *Associate Professor*, PhD, University of Georgia, 2007. Game-Based Learning; Computational Thinking; Video Analysis

**Sudweeks, Richard R.** *Professor*, PhD, University of Illinois, 1978. Educational Measurement and Evaluation

**West, Richard E.** *Assistant Professor*, PhD, University of Georgia, 2009. Communities of Innovation; Program Evaluation; Creativity, K-16 Technology Integration; Online Collaborative Learning

**Williams, David D.** *Professor*, PhD, University of Colorado, 1981. Evaluation; Qualitative Research

**Yanchar, Stephen** *Associate Professor*, PhD, Brigham Young University, 1997. Instructional Design Practices; Agency in Education; Qualitative Research Methods

**LANGUAGE STUDIES,  
CENTER FOR**

**Director:** Clifford, Ray T.

**Graduate Coordinator:** Lundberg, Grant

3086 JFSB, Provo, UT 84602-6715

(801) 422-5199

[clsgradsec@byu.edu](mailto:clsgradsec@byu.edu)

<http://slat.byu.edu/>

**THE PROGRAMS OF STUDY**

The Center for Language Studies offers a college-wide M.A. degree in Second Language Teaching (SLaT). It is anticipated that eight to ten students would be admitted into the SLaT program each year. Students are admitted to the program with a specific language emphasis, provided that there is a graduate faculty member in the target language who can serve as thesis advisor. It will normally take four semesters for a student to complete the program.

**Second Language Teaching (SLaT)  
-- MA**

The SLaT MA program is ideally suited to the needs of individuals who have completed undergraduate degrees in foreign languages and have an interest in teaching their acquired language in an advanced educational setting, such as in a college or university or in a business enterprise. The SLaT MA is not a public school certification program, but the program will be beneficial to currently certified foreign language teachers as part of their continuing professional development or as preparation to pursue a Ph.D. in foreign language education.

**Second Language Teaching  
(SLaT) - MA**

The SLaT MA program uniquely prepares students with second language teaching skills that are based on sound teaching theories that build on and go beyond the scientific study of language. The focus is on teacher preparation,



which is in great demand in today's society. This master's program will assist second- and foreign-language teachers in improving their professional qualifications and advance in their profession. There is a specific need for teachers who are prepared to teach less commonly taught languages; this program helps to satisfy this need. The SLAT program also prepares students for continued study in Ph.D. programs in foreign language education and eventual entry into academia.

#### Requirements for Degree.

- Credit hours (33): Master's Thesis Option (699R) - minimum 27 course work hours and 6 thesis hours or Master's Project Option (698R) minimum 30 course work hours and 3 project hours.
- Required Core Courses: SLAT 601, 602, 603, and 604 (12 credits) plus 3 additional courses from the following: SLAT 610, 611, 612, 613, or 614 (9 credits).
- Elective courses (6 credits):
- 3 credits of a graduate-level language, linguistics, or literature course of the language of emphasis.
- 3 credits of a graduate-level language-specific course or an additional graduate-level pedagogy course (see required core courses listed above).
- Examinations: (A) Written comprehensive exam covering student's coursework and reading list. (Students are required to take this exam during the fourth semester of study.) (B) Oral defense of thesis or project.

#### FINANCIAL ASSISTANCE

Partial tuition scholarships are available. Applicants may also contact directly the department of their language of emphasis to apply for teaching assistantships.

#### RESOURCES AND OPPORTUNITIES

**Teaching Opportunity:** Students in the SLAT program will typically have the opportunity to teach one or more classes in their language of emphasis. If such an opportunity is not offered through the student's language department, students are strongly encouraged to gain teaching experience in another second language teaching setting.

#### Office of Digital Humanities:

Students in the Second Language Teaching program may utilize facilities in the HLR for computer-assisted language instruction and research.

#### The Foreign Language Student

**Residence:** Students who desire a more intensive language study experience and practical application of the language under the direction of faculty and native residents may apply to live in the FLSR. All activities in the individual apartments in the residence are conducted in the foreign language. Housing is available for men and women in Arabic, Chinese, French, German, Italian, Japanese, Portuguese, Spanish, and Russian languages. Graduate students may participate in this program as students or as native speaker resident facilitators.

*For a more detailed description of the graduate program requirements, send for a copy of the handbook.*

#### COURSE DESCRIPTION

##### SLAT

#### 601.Survey of Second Language Teaching and Acquisition: Theory and Practice. (3)

Research in second language teaching; theories of language learning; historical trends and current practices and issues in language education.

#### 602.Linguistics for Language Teachers. (3)

In-depth knowledge of language systems, i.e., phonology, morphology, syntax, semantics, and pragmatics.

#### 603.Conducting Research in Second Language Teaching. (3)

Reviewing, understanding, and evaluating published research; designing quantitative and qualitative research studies; using basic statistical procedures for analyzing data; writing a research prospectus conforming to APA style guidelines.

#### 604.Assessing Language Skills. (3)

Purposes and uses of various forms of assessment; development of tests, surveys, questionnaires, and alternative forms of assessment; evaluation of the quality of assessments.

#### 610.Using Media and Technology in Second Language Teaching and Research. (3)

Using and applying various types of media and technology appropriate for second language teaching, learning, and research.

#### 611.Teaching Listening and Speaking Skills. (3)

Theory and research on teaching and learning listening and speaking skills; applying professional guidelines on listening and speaking; selecting and using appropriate techniques for teaching and assessing oral skills.

#### 612.Teaching Reading and Writing Skills. (3)

Theory and research on teaching and learning reading and writing skills; applying professional guidelines on reading and writing; selecting and using appropriate techniques for teaching and assessing literacy skills.

## LANGUAGE STUDIES, CENTER FOR

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### **613.Teaching and Learning About Culture.** (3)

Role of culture in second language courses; current theory and research on culture teaching and learning; techniques for teaching and assessing culture.

### **614R.Seminar in Second Language Teaching.** (3)

Topics vary. In-depth discussion about issues relating to second language learning, teaching, and research.

### **680RDirected Studies.** (1-3)

Individualized studies in language of emphasis, directed by a faculty member. Research paper required.

### **698R.Master's Action Research Project.** (1-3)

Design, production, and evaluation of MA action research project in the student's language of emphasis.

### **699R.Master's Thesis.** (0.5-6)

Includes a review of the research literature and a report on the research study. Thesis students are encouraged to work with faculty members in their areas of research.

## FACULTY

**Bateman, Blair** *Associate Professor*, PhD, University of Minnesota, 2002. Foreign Language Teaching Methods; Teaching Culture; Teaching Heritage Languages; Preparation and Development of Public School Teachers; Language Assessment

**Bell, Teresa** *Assistant Professor*, PhD, University of Arizona, 2001. Second Language Acquisition; Foreign Language Pedagogy; German Sociolinguistics

**Belnap, Kirk** *Professor*, PhD, University of Pennsylvania, 1991. The Teaching of Arabic as a Second Language; Language Policy and Planning; Sociolinguistics; The History of Arabic; L1 and L2 Literacy

**Bourgerie, Dana** *Professor*, PhD, Ohio State University, 1991. Sociolinguistics; East Asian Languages; Chinese Language Acquisition and Assessment

**Bown, Jennifer** *Associate Professor*, PhD, Ohio State University, 2004. Slavic Linguistics and Second Language Acquisition

**Bush, Michael** *Associate Professor*, PhD, Ohio State University, 1983. Second Language Acquisition and Theory; Teaching Methodology; Technology Enhanced Language Learning (TELL)

**Christensen, Matthew** *Professor*, PhD, Ohio State University, 1994. Chinese Linguistics and Pedagogy; Chinese Culture and Communication Analysis

**Clifford, Ray** *Associate Dean; Professor*, PhD, University of Minnesota, 1977. Language Testing and Technology; Teaching Methodology; Second Language Education

**Damron, Julie** *Assistant Professor*, PhD, Purdue University, 2000. Linguistics; TESL; Language Learning; Second Language Teaching Methods; Korean Language Education

**Dewey, Dan** *Associate Professor*, PhD, Carnegie Mellon University, 2001. Language Assessment; Second Language Acquisition

**Eggington, Bill** *Professor*, PhD, University of Southern California, 1985. Sociolinguistics; Contrastive Rhetoric

**Erickson, Robert** *Assistant Professor*, PhD, Brigham Young University, 2000. Second Language Acquisition Theory and Assessment; Language Teaching Methodology

**Henrichsen, Lynn** *Professor*, EdD, University of Hawaii, 1987. Cultural and Comparative Education; Language Teaching Methodology

**Knapp, Nieves** *Associate Teaching Professor*, PhD, University of Oviedo Spain, 2003. Foreign Language Teaching Methodology and Pedagogy; Cultural and Conversational Spanish

**Lundberg, Grant** *Associate Professor*, PhD, University of Kansas, 1999. Slavic Languages and Literature; Historical Linguistics; Slavic Dialectology

**Martinsen, Rob** *Associate Professor*, PhD, University of Texas, 2007. Foreign Language and Culture Education; Study Abroad Language Acquisition; Language Technology in Education

**Montgomery, Cherice** *Assistant Professor*, PhD, Michigan State University, 2009. World Language Education; Pedagogy; Curriculum Development; Transliteracy and Social Technologies; Teacher Preparation

**Moody, Stephen** *Assistant Professor*, PhD, University of Hawaii, 2014. Quantitative Sociolinguistics; Language and Culture, Computer-Assisted Language Learning (CALL); Japanese Pragmatics and Pedagogy

**Parkinson, Dilworth** *Professor*, PhD, University of Michigan, 1975. Arabic Corpus Linguistics; Sociolinguistics and Teaching of the Arabic Language

**Sememoe, Wendy** *Associate Professor*,  
PhD, University of Illinois, 2002.  
Linguistics; Research Design;  
Second Language Acquisition and  
Teacher Evaluation

**Smith, Laura** *Associate Professor*,  
PhD, University of Wisconsin,  
2004. Germanic and Theoretical  
Linguistics; Phonetical Feature  
Acquisition

**Tanner, Mark** *Assistant Professor*,  
PhD, University of Pennsylvania,  
1991. Pronunciation Pedagogy;  
Second Language Acquisition and  
Methods

**Thompson, Greg** *Assistant Professor*,  
PhD, University of Arizona, 2006.  
Spanish Language Pedagogy;  
Phonetics; Spanish Language  
Acquisition and Development

**Warnick, Paul** *Associate Professor*,  
PhD, Ohio State University, 1996.  
Japanese Language Pedagogy;  
Sociolinguistics; Pre-modern  
Japanese; Issues in Reading  
Japanese

**Watabe, Masakazu** *Professor*, PhD,  
University of Southern California,  
1978. Japanese Linguistics and  
Pedagogy; Materials Development

## LAW SCHOOL, J. REUBEN CLARK

**Dean:** Rasband, James R.  
**Associate Dean:** Scharffs, Brett G.  
**Associate Dean:** Smith, D. Gordon

340 JRCB, Provo, UT 84602-8000  
(801) 422-4277  
[admissions@law.byu.edu](mailto:admissions@law.byu.edu)  
<http://www.law2.byu.edu/>

### THE PROGRAMS OF STUDY

Students admitted to the highly competitive programs of the Law School receive a breadth and depth of training that prepare them to function in the wide range of activities that occupy the professional lawyer's life. Students gain firsthand experience with a variety of teaching and learning methods, among them Socratic or inductive teaching, problem solving, seminars, individual research, and clinical experience.

The specific objective of the curriculum is to maximize the student's mastery of legal reasoning and legal method-in addition to teaching a core of the basic substantive rules of law and imparting an appreciation for its institutions and traditions.

Students are taught to analyze complex factual situations; to separate the relevant from the irrelevant; and to reason inductively, deductively, and by analogy. Students are also schooled in the arts of written and oral advocacy.

Two degrees are offered through the J. Reuben Clark Law School: Law-JD and Comparative Law-LLM. The university has also approved programs whereby qualified students can obtain a concurrent master's degree in business administration, public administration, accountancy, education, or public policy while pursuing a law degree.

The Law School seats approximately 140 students each year in its first-year class. The juris doctorate (JD) may be completed no earlier than five fall or winter semesters and no later than sixty months after a student has begun law study at an ABA-approved law school. The LLM students receive their degree on completion of 24 credit hours earned during at least two semesters in residence.

### Comparative Law - LLM

The J. Reuben Clark Law School created the Master of Law (LLM) program in 1988 to provide an opportunity for lawyers trained in jurisdictions outside the United States to study the U.S. legal system. The program provides maximum exposure to the U.S. legal system and interaction between master of law students and students seeking the juris doctorate degree. Students obtain a solid foundation in the basic principles of U.S. law while being allowed the flexibility to pursue personal academic interests. To ensure a superior educational experience for students in the program, admission is generally limited to six to eight students per year.

The master of law (LLM) degree is conferred upon successful completion of a minimum 24 credit hours earned during at least two semesters in residence following completion of a JD degree or its equivalent outside the United States.

### Requirements for Degree.

- Credit hours (24): credits toward the LLM degree must be earned during at least two regular BYU Law School semesters.
- Required courses: each student will be required to complete Introduction to American Law as well as Legal Research and Writing during the fall semester. Additionally, each student is required to complete one of the regular first-year courses

in the JD program. The course chosen to fulfill this requirement is determined by the student in consultation with his or her faculty-appointed advisor.

- Written thesis: a student may earn up to 6 credit hours for a written thesis project supervised by an appointed thesis advisor and defended before that advisor and two additional readers. Although the written thesis is encouraged, it is not required for completion of the LLM degree.
- The student chooses the remainder of his or her curriculum from the regular juris doctor course offerings.

### **Law - JD**

The J. Reuben Clark Law School offers a course of graduate professional study leading to the juris doctorate (JD) degree. Additional information about legal education, admissions standards, and procedures-including information about the Law School Admission Test (LSAT) and registration with the Law School Credential Assembly Service (LSCAS)-can be obtained from the admissions office of the Law School or on our Web site at <http://www.law2.byu.edu/admissions>.

#### **Requirements for Degree.**

- Credit hours (90): credits toward the JD degree may be completed no earlier than five fall or winter semesters and no later than sixty months after a student has begun law study at an ABA-approved law school.
- Required courses: the following first-year courses are required for graduation: Civil Procedure, Contracts, Criminal Law, Legislation and Regulation, Property, Structures of the Constitution, Torts, Introduction to Legal Research and Writing and Introduction to Advocacy. Each student is also required to take Professional Responsibility during the second or third year.

- Substantial writing paper: each student will be required to prepare, during his or her second or third year, a substantial writing paper of satisfactory quality.
- Professional skills requirement: each student must complete at least two credit hours of externship credit or at least one of the second-year or third-year courses designated as a "Professional Skills Course."
- Residency requirement: graduation requires six regular semesters in residence. Enrollment in summer programs can reduce the number of regular semesters from six to five.
- Graduation interview: to be held with the Law School registrar four months prior to graduation.

### **Joint Law Degrees - MBA/MPA/MAcc/MEd**

#### **Joint Law and Management Degrees-JD/MBA, JD/MPA, and JD/MAcc**

The Law School and the Marriott School of Management have approved arrangements whereby qualified students may earn joint degrees from the two schools in four years of full-time graduate study. Students may earn a juris doctor (JD) degree and either a master of business administration (MBA), master of public administration (MPA), or master of accountancy (MAcc) degree.

Candidates must satisfy the admission requirements for and be admitted to each program separately.

#### **Joint Law and Master of Education Degree-JD/MEd**

The Law School and the McKay School of Education have approved arrangements whereby qualified students may earn a joint degree from the two schools. Students may earn a juris doctor (JD) degree

and a master of education (MEd) degree. Candidates must satisfy the admission requirements for and be admitted to each program separately.

### **FINANCIAL ASSISTANCE**

Some scholarship and loan funds are available to law students. Those interested in these opportunities should inquire at the Law School Admissions Office and the BYU Financial Aid Office.

**Tuition.** Since a significant portion of the cost of operating the Law School comes from the tithes of The Church of Jesus Christ of Latter-day Saints, students and the families of students who are tithe-paying members have already made a significant contribution to the university and are thus charged a lower tuition than nonmembers. This disparity is similar to the higher tuition charged by law schools of state universities to nonresidents.

Annual tuition: \$11,620 LDS

\$23,240 non-LDS

### **RESOURCES AND OPPORTUNITIES**

#### **J. Reuben Clark Law School**

**Building.** The J. Reuben Clark Law School building is located near the eastern edge of campus. Its five floors house classrooms with electrical connectivity to each student seat, wireless capabilities from all locations within the building, faculty offices, and the law library.

#### **Howard W. Hunter Law Library.**

The Howard W. Hunter Law Library is one of the leading law libraries in the country and contains an extensive collection of legal materials in both print and electronic format. In addition to offering the latest in technological facilities and services, the library also provides individual study carrels with hookups for computer access to networks, as well as study rooms for group use. Law students also have access to the holdings in the university library, the Harold B. Lee Library.



**Cocurricular Programs.** Law students publish the Brigham Young University Law Review, the BYU Journal of Public Law, the Brigham Young University Education and Law Journal, and the BYU International Law and Management Review. Law students also participate in the Moot Court Board of Advocates and Trial Advocacy programs.

**Externship Program.** This program offers an opportunity for students to participate in practical training with private law firms, the judiciary, governmental offices, or international regional offices of legal counsel for The Church of Jesus Christ of Latter-day Saints in many foreign nations.

**Student Organizations.** Within the Law School, students may participate in a number of organizations, among them the Student Bar Association, the Alternative Dispute Resolution (ADR) Society, the American Constitution Society for Law and Policy (ACS), the Black Law Students Association (BLSA), the Family Law Society, the Federalist Society, the Government and Politics Legal Society (GPLS), the Immigration Law Forum, the International Law Student Association (ILSA), Jail Outreach, Law Cycling Club (Legal Spin), the Minority Law Student Association (MLSA), the Native American Law Student Association (NALSA), the Natural Resources Law Society, Phi Delta Phi, the Public Interest Law Foundation (PILF), Real Estate Law Society, Running Objection, the Student Intellectual Property Law Association (SIPLA), the Sports and Entertainment Law Society (SpEnt), and Women In Law (WIL). For spouses of married law students there is Law Partners, and for single law students there is the Law Singles Society. Many law students also participate in the 5th Grade Mentoring Program.

## COURSE DESCRIPTION

### LAW

#### 505.Torts. (4)

Prerequisite(s): Admission to law school.

Study of the judicial process in civil actions for damages or equitable relief for physical, appropriational, and defamatory harms to personality, property, and relational interests, with some consideration of alternative reparation systems such as workers' compensation.

#### 510.Contracts. (4)

Prerequisite(s): Admission to law school.

Examination of the promises enforced by law, and the nature of the protection given. Inquiry made into the formation, performance, and discharge of contracts; their assignment, termination, and modification; and the variety, scope, and limitations on remedies. Attention will be given to Article 2 of the Uniform Commercial Code.

#### 515.Civil Procedure. (4)

Prerequisite(s): Admission to law school.

A basic study of the operation of courts, including an introduction to the organization of state and federal courts and relationships between them. Topics studied will include jurisdiction over persons, things, and subject matter; venue; the scope of litigation as to claims, defenses, and parties; pleading, pretrial motions, discovery, and pretrial conferences; trials and the functions of judges, juries, and lawyers; appeals and the role of appellate courts; and the enforcement and finality of judgments and decrees.

#### 520.Property. (4)

Prerequisite(s): Admission to law school.

Inquiry into the nature of "property" and "ownership" of land and structures on land and the ways in which ownership may be established, restricted, transferred, and divided among various persons.

#### 525.Criminal Law. (3)

Prerequisite(s): Admission to law school.

Problems in defining what conduct should be subjected to criminal penalties; the limitations of criminal law as a means for prevention and control of undesirable conduct.

#### 530.Structures of the Constitution. (3)

Prerequisite(s): Admission to law school.

The Constitution's distribution of sovereign power between the federal government and the states; its allocation of federal sovereign power among Congress, the president, and the judiciary.

#### 535.Legislation and Regulation. (3)

Prerequisite(s): Admission to law school.

Introduction to lawmaking in the modern statutory and administrative state. Examining the way Congress and administrative agencies adopt binding rules of law (statutes and regulations, respectively) and the way the implementing institutions - courts and administrative agencies - interpret and apply these laws. Considering the theories and justifications behind modern legislative and regulatory behavior, the incentives that influence the behavior of various actors, and the legal rules that help structure the relationships among Congress, the agencies, and the courts.

**545.Introduction to Legal Research and Writing. (3)**

Prerequisite(s): Admission to law school.

Introduction to tools and techniques essential to law practice and legal scholarship: legal analysis, research using print sources, and objective writing. Student will write three predictive office memoranda based on library research and complete a series of legal research quizzes and a legal research final exam.

**546.Introduction to Advocacy. (2)**

Prerequisite(s): LAW 545; Admission to law school.

Focuses on appellate legal writing and oral advocacy. Student will prepare an appellate brief and orally argue the case. Also includes training for online legal databases and introduction to administrative law and legislative history research.

**549.Professional Seminar. (0.5)**

Prerequisite(s): Admission to law school.

Integrating religious and moral values into a model of legal professionalism; issues regarding legal education, the legal system, the practice of law, and the roles of lawyers.

**550.Professional Development Lecture Series 1. (0.5)**

Prerequisite(s): Admission to law school.

This course is specifically designed to assist law students in determining which career path they want to pursue. Each session features a different practicing attorney who will discuss the nuts and bolts of practicing law in areas such as real estate, law office management, part-time employment options, tax, bankruptcy, international corporate law, alternative dispute resolution, family law, natural resources and environmental law, personal injury, medical malpractice, law school teaching and administration, intellectual property, immigration, and employment law. Different specialties will be featured each semester, so students may register for both the fall and winter lecture series.

**551.Professional Development Lecture Series 2. (0.5)**

Prerequisite(s): Admission to law school.

This course is specifically designed to assist law students in determining which career path they want to pursue. Each session features a different practicing attorney who will discuss the nuts and bolts of practicing law in areas such as real estate, law office management, part-time employment options, tax, bankruptcy, international corporate law, alternative dispute resolution, family law, natural resources and environmental law, personal injury, medical malpractice, law school teaching and administration, intellectual property, immigration, and employment law. Different specialties will be featured each semester, so students may register for both the fall and winter lecture series.

**552.Professional Development Skills Training. (0.5)**

Prerequisite(s): Admission to law school.

This course will help students to create resumes, business correspondence, and marketing plans; to understand ways to effectively interview and build a professional network; and to strategically incorporate technology and published resources in the job search.

**599R.Externship. (1-12)**

Prerequisite(s): First-year law courses.

Students are able to earn one credit for each 50 hours of work performed in an approved externship.

**602.Administrative Law. (3)**

Prerequisite(s): First-year law courses.

An examination of the administrative process. The course examines why administrative agencies are created, how they obtain information and the uses of that information, what proceedings (rulemaking/adjudication) agencies can commence, and what controls over agency action (political/judicial) exist. The role of the attorney in this process is emphasized.

**603.Criminal Procedure: Investigation. (3)**

Prerequisite(s): First-year law courses.

Problems in administering a system of criminal law; constitutional and policy limitations upon public officers in dealing with suspected, charged, and convicted offenders.

**605.Antitrust. (3)**

Prerequisite(s): First-year law courses.

Development of legal doctrine under the Sherman Act and supplemental legislation, including price fixing, division of market, monopolization, mergers, tying and exclusive dealing arrangements, boycotts, and special relationships between principles of patent and antitrust law. Emphasis: the relationships between principles of law and economics, examined in the context of certain key cases.

**606.Anglo-American Legal History. (2-3)**

Prerequisite(s): First-year law courses.

Survey of the legal systems and values that influenced Western civilization, with emphasis on the history of Anglo-American common law.

**607.Ancient Laws in the Bible and Book of Mormon. (3)**

Prerequisite(s): First-year law courses.

Comparative study of legal topics in the law codes and legal systems of the Old Testament, legal narratives in the New Testament, the trials of Jesus and Paul, and the legal cases in the Book of Mormon, as well as the codes of the Sumerians, Babylonians, Hittites, Assyrians, and Greek and Roman law.

**608.Debtors and Creditors. (2-3)**

Prerequisite(s): First-year law courses.

A practical course for lawyers who plan on representing businesses or individuals in today's economy. The course covers the relationship between debtors and creditors under both state debt collection law and bankruptcy law, with an emphasis on bankruptcy law. The course focuses on bankruptcy issues from both a consumer and business perspective, covering bankruptcy and commercial principles applicable in a wide variety of legal and business settings.

**609.Freedom of Religion. (3)**

Prerequisite(s): First-year law courses.

Appropriateness of public action based on religious belief, with specific application to questions of abortion, same-sex orientation, gender discrimination, and pornography.

**610.Business Organizations. (3)**

Prerequisite(s): First-year law courses.

Introduction to business associations, agency, uniform partnership acts, the essentials of corporate formation, shareholders rights, special problems of closely held businesses, preemptive rights, etc.

**612.Accounting for Lawyers. (2-3)**

Prerequisite(s): First-year law courses.

This course teaches generally accepted accounting principles, practices, and standards. Includes information about accrual accounting and revenue recognition, double-entry record keeping, development of accounting principles and auditing standards, the time value of money, financial statement analysis, and contingencies. Intended for law students who do not have an accounting background. Students who have a substantial background in accounting or who have recently taken an introductory accounting class are ineligible to take or receive credit for this course.

**613.Community Lawyering. (3)**

Prerequisite(s): First-year law courses.

Christian reconstruction of the lawyer's role in public life, especially how that role is performed among the disadvantaged.

**615.Secured Transactions. (3)**

Prerequisite(s): First-year law courses.

All aspects of security in personal property (personal property includes everything except land). Problems and legal principles relevant to the creation of the security interest, to its perfection, to priorities between competing security interests and between a security interest and other kinds of property interest, to payment and redemption, and to realization procedures. Article 9 of the Uniform Commercial Code.

**616.Commercial Paper. (3)**

Prerequisite(s): First-year law courses.

Negotiable instruments (checks, drafts, notes) under Articles 3 and 4 of the Uniform Commercial Code; letters of credit and electronic transfers.

**617.Comparative Law. (3)**

Prerequisite(s): First-year law courses.

Non-common-law legal tradition, emphasizing civil law. Legal traditions of Islamic and socialist countries.

**619.Conflict of Laws. (2-3)**

Prerequisite(s): First-year law courses.

Jurisdiction issues, choice of law, and recognition of judgments in cases involving interstate and state-federal conflicts.

**620.National Security Law. (3)**

Prerequisite(s): First-year law courses; Law 659 and/or Law 751.

This course surveys the framework of domestic and international laws that variously authorize and restrain the pursuit of the U.S. government's national security policies. "National security" can mean a great many things, of course, but for purposes of this course we will be concerned primarily with the interactions of the government and the allocation of power between the branches of the government in relation to (i) the use of military force, (ii) the activities of the intelligence community, and (iii) counter terrorism-related activities (including the interrogation, detention, and trial of captured persons).

**621.The Fourteenth Amendment. (3)**

Prerequisite(s): First-year law courses.

Express and implied individual rights guaranteed by the privileges or immunities, equal protection, and due process clauses of the Fourteenth Amendment.

**622.Employment Law. (3)**

Prerequisite(s): First-year law courses.

Employment discrimination: benefits, compensation, and hours; workplace safety and health. Offers an overview of the important legal issues that are raised in the context of the employment relationship. Discussion of employment as a contractual agreement, including tort and statutory protections, such as wrongful discharge, wage and hour laws (FLSA), leave (e.g. FMLA), safety (OSHA and workers comp), unemployment insurance, discrimination (Title VII; ADA; ADEA), privacy and freedom of speech, and intellectual property issues such as R&D ownership, trade secrets and non-competition.

**623.Business Reorganization Under the Bankruptcy Code. (3)**

Prerequisite(s): LAW 608; First-year law courses.

A practical analysis of the law and policy underlying business reorganizations in Chapter 11: from filing of the petition to the confirmation of the plan.

**624.Environmental Law. (3)**

Prerequisite(s): First-year law courses.

A study of the major federal laws relating to environmental protection, including the Endangered Species Act, the Clean Air Act, the Clean Water Act, the National Environmental Policy Act, and CERCLA.

**625.Evidence. (3)**

Prerequisite(s): First-year law courses.

An examination of the law of evidence, including the principles governing the admissibility of evidence, the competency of witnesses, and the function of lawyer, judge, and jury in the presentation and evaluation of evidence.

**626.The First Amendment. (3)**

Prerequisite(s): First-year law courses.

Rights guaranteed by the speech, press, and religion clauses of the First Amendment.

**627.Appellate Practice and Procedure. (2-3)**

Prerequisite(s): First-year law courses.

Explores a range of procedural issues that arise in appellate litigation in the federal and state courts, including preservation of issues; appealability; parties on appeal; perfecting an appeal; relief pending appeal; and standards of review. Students will consider these issues as they arise in cases and rules in federal and state appellate systems, with some comparative analysis of the differences between the two systems.

**628.Remedies. (3)**

Prerequisite(s): First-year law courses.

A study of the general principles and basic rules governing the rich inventory of remedies available through American courts. The principles associated with the law of remedies cut across substantive fields and guides the lawyer in fashioning or defending against various remedial schemes in any substantive contest. The course emphasizes issues and developments of contemporary importance and includes public as well as private law remedies. In this course we will study the law of remedies through the traditional caselaw method and by use of practice-oriented litigation exercises.

**630.Criminal Trial Practice. (2)**

Prerequisite(s): First-year law courses.

This course will develop the art and practical skill of trial advocacy. It will focus on typical situations that arise in the trial of a criminal case. Emphasis will be placed on the academic theory, as well as the technique of the whole range of advocacy skills. The developed skills will be transferable to general civil litigation.

**632.Family Law. (3)**

Prerequisite(s): First-year law courses.

This class is an introduction to the state, federal, and international laws regulating the family. Topics include the creation (marriage, adoption, etc.), on-going relations (marital property, emancipation, parental rights, partner abuse, etc.), and dissolution (divorce, TPR, alimony, property division, custody, visitation, child support, etc.) of actual and quasi-spousal relations and parent-child relations.



**633.Children and the Law. (2)**

Prerequisite(s): First-year law courses; Law 632.

Issues relating to state regulation of parent-child relations, including children's rights, parent rights, juvenile courts, adoption, health decisions, educational decisions, child abuse and neglect, youth status offenses, and delinquency.

**634.Law and Public Education. (2)**

Prerequisite(s): First-year law courses.

Constitutional issues of public education: free speech, student conduct, teacher rights and discipline, equal access, special education, home schools, and religion in the public schools.

**635.Federal Courts 1. (3)**

Prerequisite(s): First-year law courses.

This course provides an important foundation for litigation, civil rights, and government practice careers and for judicial clerkships. It provides an advanced study of the federal structure of our judicial system, with emphasis on the relationship and respective powers of federal and state courts and the relationship between the legislative, executive, and judicial branches of the federal government. Topics studied include what cases are justiciable, the power of Congress to define and limit the jurisdiction of federal courts, how federal law is applied in state courts, federal court review of state court decisions, the power of federal courts to create federal common law, civil rights litigation and immunities, and judicial federalism.

**637.Advanced Estate Planning. (3)**

Prerequisite(s): First-year law courses.

Effective disposition of wealth by inter vivos gift and testamentary transfer.

**639.International Business Transactions. (3)**

Prerequisite(s): First-year law courses.

Making, regulating, and breaking international business transactions.

(1) Formation of international business transactions, focusing on contracting for and financing the international sale of goods, licensing and distributorship agreements, and foreign direct investment. (2) Regulation stage of international business transactions, including the transactional reach of U.S. government regulation, regulation of corrupt payments to foreign officials, international protection of intellectual property, and securities and antitrust aspects of international transactions. (3) Breaking international business transactions; transnational dispute resolution through arbitration and through transnational litigation in U.S. courts.

**640.Federal Taxation 1. (4)**

Prerequisite(s): First-year law courses.

A study of federal personal income tax, with an introduction to business and corporate income tax and federal tax procedure. Emphasis is placed on developing the student's ability to exam and understand statutory, judicial, and administrative tax law and to apply the law in solving specific problems.

**641.Federal Taxation 2. (4)**

Prerequisite(s): First-year law courses.

This course covers in detail the federal income tax consequences flowing from the creation, operation, dissolution, and sale of partnerships, limited liability companies, and corporations and examines federal tax considerations bearing on the choice between conducting a business in partnership, limited liability company, or corporate form.

**643.International Taxation. (3)**

Prerequisite(s): LAW 640; First-year law courses.

Rules governing U.S. taxation of income earned within the U.S. by foreigners. Critique of these rules in light of economic and international law norms.

**645.Federal Indian Law. (3)**

Prerequisite(s): First-year law courses.

Law of the federal government and the states respecting Native Americans and their land. Relationship of European discoverers and Native Americans during colonial period; Native American treaties, executive orders, and agreements; changing United States policy respecting Native Americans; federal, state, and tribal jurisdictions, civil and criminal; tribal courts; Native American hunting and fishing rights, water rights, and civil rights.

**646.Jurisprudence. (3)**

Prerequisite(s): First-year law courses.

This course will study the classical sources and conceptions of law, including natural law, natural rights, positivism, realism, and the "legal process" school.

**649.Banking Law. (2-3)**

Prerequisite(s): First-year law courses.

Review the laws affecting commercial banks and thrift institutions, the functions of the various federal and state regulatory agencies, the development of innovative forms of financial services, the effects of electronic technology upon banking law and interstate banking. Provides an overview of the different regulatory regimes affecting financial institutions (e.g., insurance companies, broker-dealers, investment banks, private funds, and depository institutions), with primary focus on banking law and regulation.

**650.Real Estate Finance. (3)**

Prerequisite(s): First-year law courses.

Review of real estate transactions. Real estate finance including mortgages, trust deeds, installment sales contracts, other mortgage substitutes, receiverships, transfer of real estate security interests, discharge, deeds in lieu of foreclosure, foreclosure, foreclosure sales, redemption, deficiency payments, priorities, mechanics liens, judgment liens, purchase money mortgages, and ground leases.

**652.Legislation. (2)**

Prerequisite(s): First-year law courses.

Process by which policy is translated into statutory law and how that law is applied and interpreted, emphasizing legislative process, separation of powers, and statutory interpretation.

**653.Legal Interviewing and Counseling. (3)**

Prerequisite(s): First-year law courses.

An intensive skill development course that uses simulation methods to develop proficiency in the use of legal interviewing and counseling methods and techniques.

**654.Child Advocacy. (2)**

Prerequisite(s): First-year law courses.

Learn about the juvenile court system and how issues of abuse, neglect and delinquency are handled. Learn how the judicial system affects the lives of children and how advocates can make a difference in the system. Opportunity to "shadow" attorneys from the Guardian Ad Litem's office, the Public Defender's and Attorney General's offices, and to sit in court with a Juvenile Court Judge. Students will tour the Detention Center, the House of Hope, Independence High School, Lightning Peak, Family Support and Treatment and the Children's Justice Center.

**655.Labor Law. (2)**

Prerequisite(s): First-year law courses.

Collective bargaining relationships and how agreements are negotiated and administered in the private sector. Developments governing the non-union workplace.

**656.Public Lands and Natural Resources. (3)**

Prerequisite(s): First-year law courses.

Natural resources law in context of federal public lands. Topics covered include public land law, water, hard-rock minerals, grazing and range management, wildlife, and recreation law.

**658.Land Use Planning. (3)**

Prerequisite(s): First-year law courses.

An examination of governmental control over private land use and development. Subjects include zoning, subdivision and growth controls, and various constitutional issues raised by land use restraints.

**659.Public International Law. (3)**

Prerequisite(s): First-year law courses.

An examination of the nature of public international law including custom and treaties as sources of law, international responsibilities and remedies, and jurisdictional issues.

**660.Professional Responsibility. (3)**

Prerequisite(s): First-year law courses.

This course uses the Model Rules of Professional Conduct as a backdrop for an examination of issues in ethical lawyering.

**662.Securities Regulation. (3)**

Prerequisite(s): LAW 610; First-year law courses.

Securities Act of 1933, Securities Exchange Act of 1934, state blue sky laws and regulations, distribution and trading of securities, express and implied civil liabilities, criminal liability, insider trading, tender offers, broker-dealer regulation, and the role of lawyers.

**663.State and Local Government 1. (3)**

Prerequisite(s): First-year law courses.

Interrelationship among national, state, and local governments and the powers of each, as well as examination of separation-of-powers principles and impact of political process at state and local level.

**665.Origins of the Constitution. (3)**

Prerequisite(s): First-year law courses.

Review of drafting and adoption of Constitution and Bill of Rights; development of the ideas of the Constitution--what was intended and why.

**666.Wills and Estates. (3)**

Prerequisite(s): First-year law courses.

Transfer of property through intestate succession; wills and will substitutes; effect of community property ownership; legal and ethical issues surrounding end-of-life decisions, including living wills, medical directives, and medical powers of attorney; administration of decedents' estates.

**668.Negotiation. (3)**

Prerequisite(s): First-year law courses.

This course focuses on three areas: (1) learning the fundamentals of negotiation, (2) learning strategies and methods for dealing with difficult people and difficult situations, and (3) getting enough practice in applying the strategies and methods that students become skillful in using them.

**669.Civil Discovery. (2)**

Prerequisite(s): First-year law courses.

Students will learn about the discovery process in civil litigation, including depositions, the production of documents, interrogatories, requests for admissions, mandatory disclosures, subpoenas, expert witnesses, and electronic discovery.

**671.Oil and Gas. (2)**

Prerequisite(s): First-year law courses.

This course will include coverage of the following: the nature of interests in oil and gas, the oil and gas lease and associated problems, title and conveyancing problems with respect to transfers of oil and gas interests, and pooling and unitization.

**674.Law Office Management. (2)**

Prerequisite(s): First-year law courses.

This course is designed to introduce law students to issues that arise in the private practice of law. The underlying thesis is that a law office is a business, and that success in private practice is as much a function of effective management as it is a function of mastering substantive legal knowledge. The course looks at the organization of the law firm; the partnership, the professional corporation, and the proprietorship including the partnership or shareholder agreement. The roles of partners/shareholders and associates will be addressed, particularly with respect to the income production and compensation. One segment examines non-lawyer personnel: secretaries, paralegals, and other employees. Another segment addresses the law office itself: equipment, library, layout and design, supplies, and furniture. An important aspect of any office is the effectiveness of its system, both substantive and administrative, and the class will study how to implement such systems. The course will emphasize practical information as opposed to theoretical concepts.

**675.Civil Rights. (2-3)**

Prerequisite(s): First-year law courses.

Focuses on the current importance and application of the civil rights laws enacted after the Civil War and examines the Reconstruction statutes with particular emphasis on 42 U.S.C. Section 1983. These laws provide the essential foundation for modern litigation on a wide range of constitutional and statutory protections and provide the basis for "structural reform" litigation seeking to alter the operation of governmental institutions. Also addresses related topics such as government official liability, qualified and absolute immunities from suit, and other procedural and remedial issues that frequently arise in civil rights actions.

**677.Charitable Organizations. (2)**

Prerequisite(s): First-year law courses.

Practical and theoretical concerns in organizing and representing nonprofit or tax-exempt entities.

**678.Social Policy and Feminist Legal Thought. (3)**

Prerequisite(s): First-year law courses.

Feminist jurisprudence. Various doctrinal strains in development of feminist legal theory and method; applying them to facially neutral legal issues. Rape, domestic violence, employment discrimination, historical and sociological gender treatment, and practical changes in legal profession accompanying influx of greater numbers of women lawyers.

**683.Trusts. (2)**

Prerequisite(s): First-year law courses.

This course examines the legal framework of private and charitable trusts as vehicles for the donative disposition and management of personal wealth, both inter vivos and testamentary with emphasis on the nature of the fiduciary obligations of trustees and the rights and obligations of trust grantors and beneficiaries.

**684.Water Law. (3)**

Prerequisite(s): First-year law courses.

State, federal, and international law respecting water resources allocation, development, management and conservation.

**685.Introduction to American Law. (3)**

Prerequisite(s): Must be an LLM candidate.

A survey of basic concepts and institutions in the American legal system. The survey is designed for persons who have received their law degree or its equivalent from a university outside the United States.

**686R.Special Topics in Law. (1-2)**

Prerequisite(s): First-year law courses.

**687R.Special Topics in Law. (1-4)**

Prerequisite(s): First-year law courses.

**688.European Union Law (2-3)**

Prerequisite(s): First-year law courses.

Introduces students to both the governing institutions of the EU and the structure of the EU legal system. Examines the content and effects of those parts of EU law that are most important to making the EU function as a single community.

**689.Computer-Based Practice System (2)**

Prerequisite(s): First-year law courses.

Examines the role of practice systems in the delivery of legal services and teaches students to design and author practice systems. Provides students with the fundamental design and authoring skills needed (1) to build practice systems to support their individual practice needs and (2) to be effective consumers of commercially available practice systems.

**690.Criminal Trial Advocacy. (2)**

Prerequisite(s): LAW 630

This course is designed for students who are interested in a career in criminal law, and have taken the first-year criminal law course. While it would be helpful for students to have taken criminal trial practice first, it is not a prerequisite. The course curriculum covers many of the aspects of criminal trial practice beyond the basics of courtroom practice. Subjects to be covered include criminal discovery practice, grand jury practice, representation of clients pre-indictment, pretrial motion practice (motions to suppress, etc.), jury selection and jury instructions, affirmative defenses (insanity, alibi, self defense, etc.), use of experts in criminal cases and investigators and agents, organizing for trial, use of exhibits, bench and jury trial strategies as well as advocacy before judges versus juries, sentencing considerations, and post-trial motions to include perfecting an appeal, and appeals.

**691.Criminal Procedure: Adjudication. (3)**

Criminal procedure from the filing of charges through the appeals. Pretrial release and detention, the preliminary hearing, the grand jury, the charging instrument, joinder and severance, discovery, selected trial issues, plea bargaining, sentencing and appeals.

**692.Cyberlaw. (3)**

Prerequisite(s): First-year law courses.

Covers issues in regulating cyberspace (both nationally and internationally), privacy, ownership and access, and speech and content. Briefly reviews intellectual property issues online, primarily copyright.

**693.Disaster Law. (2-3)**

Prerequisite(s): First-year law courses.

Examines the legal framework--both federal and state--for preparing for, responding to, and mitigating natural disasters. Considers the human contributions to "natural" disasters, including social vulnerability and the ways that existing legal structures exacerbate disaster risk. Confronts the difficulties of legislating in the face of uncertainty, developing fair compensation and insurance schemes, and rebuilding communities devastated by disaster.

**694.Domestic Relations. (2)**

Prerequisite(s): First-year law courses.

Learn about the practical issues involved in handling a divorce case. Study the process, the documents and the primary issues involved in divorce and custody cases. Students will have the opportunity to work with real cases through the Family Justice Center on Tuesday evenings from 5:00-9:00 p.m. Students do not need to be available every Tuesday or for the full range of hours.

**697.Employment Discrimination Law. (0-3)**

Prerequisite(s): First-year law courses.

Examines the theories and policies underlying anti-discrimination laws and the ever-shifting statutory, regulatory, and case law relating to the prevention of unlawful discrimination in the workplace. Focuses on existing anti-discrimination laws, as well as discussing the procedural process for prosecuting and defending discrimination claims.

**698R.Skills Lab. (1-3)**

Prerequisite(s): First-year law courses.

Students practice lawyering skills, either through simulations or in the field. An appendage to a doctrinal course; students in the lab must be enrolled concurrently in the related doctrinal course.

**700.International Protection of Religious Freedom. (2)**

Prerequisite(s): First-year law courses.

U.S. and international religious liberty issues - principles, methodologies, international human rights. Analyzing religious liberties in countries around the world.

**702.Church and State in the United States. (2)**

Prerequisite(s): First-year law courses.

U.S. and international religious liberty issues. Focuses on free exercise and establishment clauses of First Amendment.

**703.Real Estate Development. (3)**

Prerequisite(s): First-year law courses.

Risks in real estate development and steps to take a real estate project to completion. Market conditions for the proposed use and site, planning/zoning issues and resolutions, financing, site-related legal issues.

**704.Immigration Law. (2-3)**

Prerequisite(s): First-year law courses.

Overview of the powers to regulate immigration law; admission and removal of foreigners; refugee and asylum law; impact of business/employment-based immigration.

**705.Civil Trial Practice 1. (2)**

Prerequisite(s): First-year law courses.

The skill of interviewing, drafting, negotiating, and using time efficiently in the context of preparing a legal matter; carrying a case through all the stages of preparation and litigation.



**706.Civil Trial Practice 2. (2)**

Prerequisite(s): First-year law courses.

The skills of interviewing, drafting, negotiating, and using time efficiently in the context of preparing a legal matter; carrying a case through all the stages of preparation and litigation.

**707.Health Law and Policy. (2)**

Prerequisite(s): First-year law courses.

An interdisciplinary introduction to the largest industry in the United States, the health care industry. Subjects to be covered include health care regulatory law (EMTALA, HIPAA, ERISA, Medicare, Medicaid), health care policy with emphasis on access to health care, and how to advocate for health care consumers.

**708.Comparative Constitutional Law. (2)**

Prerequisite(s): First-year law courses.

Initial constitutional formation and constituents power, separation of powers, judicial review, federalism, freedom of religion and speech, equal protection, privacy, etc.

**710.Advanced Comparative Law 1. (2)**

Prerequisite(s): First-year law courses. Editing experience or completion of an international or comparative paper prior to the start of the course.

Papers written on transnational and comparative topics during fall prepared for possible inclusion in law review.

**713.Supreme Court. (2)**

Prerequisite(s): First-year law courses.

Examining the U.S. Supreme Court emphasizing participation in hands-on exercises. Student will draft one opinion on a case on which he or she sits.

**715.Alternative Dispute Resolution. (2)**

Prerequisite(s): First-year law courses.

Theory and practice of dispute resolution, emphasizing alternatives to traditional litigation such as negotiation, mediation, and arbitration as well as "hybrids."

**717.Joseph Smith and Early American Law. (2-3)**

Prerequisite(s): First-year law courses.

Joseph Smith's ideas and experiences involving the law from 1805-1844. Projects related to the Joseph Smith Legal Papers. Topics: religious liberty, civil rights, disturbing the peace, copyright, civic virtue, marriage, militias, treason, conspiracy, prisons, petitions, city charters, incorporation, property, debt, bankruptcy, freedom of the press, extradition, writs of habeas corpus, elections, abolition, slander, murder, and revelations and teachings of the prophet on civil and divine law.

**719.International Environmental Law. (2-3)**

Prerequisite(s): First-year law courses.

Developing international regimes and norms relating to protection of global environment, including climate change, preservation of wildlife, and biodiversity; freshwater resources and Law of the Sea.

**720.Legal Research and Writing. (2)**

Prerequisite(s): Must be an LLM candidate.

Basic research in American legal tradition and personalized training in writing legal documents in English for non-U.S. attorneys in the LLM program.

**722.Principles of Trial Advocacy. (2)**

Prerequisite(s): First-year law courses.

Basic principles of litigation skills and trial advocacy, including opening statements, direct examination, admissibility of proof, objections, and closing statements.

**724.Basic Mediation. (3)**

Prerequisite(s): First-year law courses.

Fundamental communication and mediation skills. Simulated exercises and role playing. Participation in community mediation or small claims court.

**726.Basic Estate Planning. (2)**

Prerequisite(s): LAW 666; First-year law courses.

Problem-based examination of planning strategies commonly used to accumulate, manage, and dispose of family wealth.

**727.Trademark and Unfair Competition Law. (3)**

Prerequisite(s): First-year law courses.

Introduction to Lanham Act and related common law doctrines designed to protect against consumer confusion and appropriation of commercial goodwill. In addition to the technical requirements for trademark eligibility, registration, and infringement, the constitutional and economic underpinnings of trademark protection will be considered and current trends toward the "propertyization" of trademark law will be evaluated. Will also include material on the trademark treatment of Internet domain names, metatags, and links.

**728.Copyright Law. (3)**

Prerequisite(s): First-year law courses.

Copyright's purpose, statutory structure, application in the courts, and role within intellectual property law and society. Topics include the subject matter requirements for copyrightability; the exclusive rights of copyright owners; duration, ownership, and transfer; copyright infringement litigation; contributory and vicarious liability; and fair use.

**729.Solo and Small Firm Practice. (2)**  
Prerequisite(s): First-year law courses.

Skills required to build a solo or small firm law practice. Topics include locating and equipping the law office, building a client base, managing time, fee management, specializing, managing administrative staff, ethical standards, and creating relationships with other participants in the legal system.

**730.Corporate Counsel. (2-3)**  
Prerequisite(s): First-year law courses. Law 610, Business Associations, is required prior to or concurrently with this course.

The role of the corporate counsel in setting the direction of the corporation, navigating complex internal relationships, and managing challenging external relationships with various corporate stakeholders.

**731.Introduction to Intellectual Property. (3)**

Overview course covering the basics of intellectual property (IP) law---trade secrets, patents, copyrights, and trademarks, as well as selected other state intellectual property rights.

**732.Immigrant Rights. (2-3)**  
Prerequisite(s): First-year law courses.

This course is devoted to an exploration of the rights and obligations aliens have when they are within U.S. borders. Students will examine when and how these rights and obligations are complicated for individuals and communities by a lack of U.S. citizenship. For example, are noncitizens eligible for welfare benefits or public employment? Should lawful permanent residents be allowed to vote? Can lawfully admitted nonimmigrants become public school teachers, lawyers, or police officers? If noncitizens are here unlawfully, are they protected by employment law or have access to public education or to driver licenses? Can states and cities block their access to housing or jobs? More generally, we will consider whether the rights of noncitizens come from the U.S. Constitution or from statutes, and when they are best analyzed from a civil rights or a human rights perspective. We will also examine the citizen/non-citizen distinction in historical and comparative perspective, as part of the larger question of what it means to be "foreign." These questions often implicate matters of race, gender, and class.

**733.Media Law. (3)**

The intersection of media and the law and impact upon the press. Prior restraint, reporter's privilege, access to court proceedings, libel, appropriation, and rights of privacy.

**734.Fundamental Lawyering Skills. (3)**

The primary focus of this survey course is on interviewing, counseling, mediation, negotiation and persuasive fact analysis---skills deemed essential to the overall success of a lawyer.

**736.Mergers and Acquisitions. (3)**  
Prerequisite(s): First-year law courses.

This course will review a wide range of issues related to buying and selling companies, including transaction alternatives, tax roadblocks, the essential elements of the acquisition agreement and risk allocation strategies of the buyer and the seller. The course will address the differences between stock and asset acquisitions, and issues related to valuing a business, successor liability, and the attorney's role in representing the buyer or seller in an acquisition transaction.

**737.Law of Higher Education. (2)**  
Prerequisite(s): First-year law courses.

A comprehensive review of the legal principles and practices involved in the administration of institutions of higher education in the United States.

**738.Law of Armed Conflict. (2-3)**  
Prerequisite(s): Law 659.

Detailed examination of the Law of Armed Conflict (LOAC) and its application on the modern battlefield. Loosely based on a historical scenario which will help illustrate the principles, doctrines, and law that govern the use of force by a nation. Covers general principles applicable to armed conflict, followed by detailed study of specific law of armed conflict legal principles and provisions.

**739.Legal Drafting. (2)**  
Prerequisite(s): First-year law courses.

Learn: (1) how legal drafting differs from other writing; (2) how to easily organize your documents; (3) how to address your audience convincingly; (4) how to use a simple technique to assure accurate interpretation of your documents in the future; (5) how to simply frame complex legal issues; and (6) how to write precisely. Learn the fundamental rules of drafting and analyze violations of those basic rules.

**740.Public Speaking for Lawyers. (3)**

Communication and interdisciplinary theories and strategies needed for effective persuasive public speaking: speech study, audience analysis, outlining, documentation, organizational skills, word choice, and presentation.

**741.Legal Scholarship. (2-3)**

Prerequisite(s): First-year law courses.

Helps students begin to prepare for a career in legal academics. Students will work to identify areas of scholarly and teaching interest, develop a research agenda, prepare a scholarly article, present a job talk, and understand the academic hiring process.

**742.Mediation Practicum. (1-2)**

Prerequisite(s): LAW 724; First-year law courses.

Students build on the basic skills they learned in Basic Mediation both in weekly meetings and in participating in actual mediations in small claims court and other venues.

**743.Advanced Appellate Brief Writing. (3)**

Persuasive writing techniques, organization, strategy-priority of arguments, handling a circuit split, policy arguments, standards of review, persuasion techniques, handling adverse authority, and effective counter argument.

**745.Patent Law. (3)**

Prerequisite(s): LAW 731

Focuses on the U.S. patent system and is designed for those with a significant interest in patent law and patent practice.

**746.Presidential Power. (2)**

Prerequisite(s): First-year law courses.

Examines the constitutional law that creates, defines, and limits the power of the American presidency. Emphasis given to the debates that preceded the drafting of Article II and accompanied the ratification of the Constitution, and the history of the exercise of presidential power. Special emphasis given to the administrations of Lincoln, the two Roosevelts, and the presidents since the emergence of the United States as the pre-eminent nation in the global community after World War II.

**747.Public Speaking for Lawyers. (2)**

Prerequisite(s): First-year law courses.

Examines public speech from both theoretical and practical perspectives, and enables students to develop a skill-set heavily relied upon by attorneys from all practice backgrounds. Examines communication and interdisciplinary theories and mechanics/strategies needed for effective persuasive public speaking like speech study, audience analysis, outlining, documentation, organizational skills, word choice, and presentation. Every speech will focus on topics that are legally relevant.

**748.Sentencing. (2)**

Prerequisite(s): First-year law courses.

Examines law and policy with respect to sentencing of adult offenders in the United States. Looks at theories, structures and practices involved in sentencing and sentence decision-making. Interactive, discussion-oriented course including presentations from expert practitioners such as judges, prosecutors, defense counsel, and community leaders and advocates.

**749.Technology Licensing. (2-3)**

Prerequisite(s): First-year law courses.

An overview of the substantive issues and negotiation positions involved in licensing intellectual property rights through technology transfer, OEM, distribution, end user, joint venture, and related agreements. The class will emphasize developing client counseling skills and understanding both the legal arguments and the business context surrounding the most commonly negotiated provisions in licensing and IP agreements.

**750.Transaction Lawyering. (2-3)**

Prerequisite(s): First-year law courses.

Emphasizes practical skills over substantive knowledge, teaches the elements of contracts and how these elements work together. Learn how to translate what your client wants to accomplish into a clear and effective contract, and how to revise contracts with an eye to advocacy rather than stylistic preference. Work with various forms of existing agreements to craft contracts tailored to your client's needs. Prepare contracts and documents used by early stage companies.

**751.U.S. Foreign Relations Law. (3)**

Prerequisite(s): First-year law courses.

Examines constitutional, statutory, and common law doctrines that govern the United States' conduct of foreign relations. Focuses on the allocation of foreign relations authority, both among the branches of the federal government and between the federal and state governments. Specific topics include the scope of the treaty power, the constitutionality of executive agreements, the judiciary's role in deciding foreign relations questions, and the domestic legal status of international law.

**753.White Collar Crime. (2-3)**

Prerequisite(s): First-year law courses.

Explores what white collar crime is, what separates it from traditional street crime, and surveys many of the classic types of white collar crime. Covers various types of fraud and white collar offenses including ponzi schemes, money laundering, cyber crimes, healthcare fraud, securities fraud, and public corruption. Reviews the major state and federal statutes which are used to prosecute these crimes as well as reviewing key principles in the investigation of white collar crime such as investigative guidelines. Examines how to accurately assess and determine mens rea in a white collar case.

**754.Youth in Mediation. (2)**

Prerequisite(s): First-year law courses.

Work with the juvenile justice system and learn the aspects of restorative justice. Discuss the impact youth crime has on victims, offenders, families and communities. This skills-based class teaches both basic and advanced techniques for mediation, specially focusing on parent/teen and victim/offender mediation. Completion of the course will give you 28 training hours toward court qualification for mediation in the State of Utah. There is a highly recommended and OPTIONAL 1-credit, 50-hour externship. See Law 599R, Youth in Mediation Externship.

**757.Domestic Violence Intervention. (2)**

Prerequisite(s): First-year law courses.

Learn about the dynamics involved within abusive families and how those dynamics play out in court. Learn how domestic violence is treated in each context that might be brought to court: criminal actions, protective and restraining orders, personal injury cases, custody and divorce actions and within the juvenile court system. Students will have the opportunity to work with real cases through the Family Justice center on Tuesday evenings from 5:00-9:00 p.m. Students do not need to be available every Tuesday or for the full range of hours.

**758.Elder Law. (2)**

Prerequisite(s): First-year law courses.

Learn how to handle legal issues common to the elderly: estate planning and medical directives; consumer fraud; public benefits such as Medicaid, Medicare, social security; nursing homes; property issues; and elder abuse. Students will meet with elderly clients on a weekly basis at local senior citizen centers. Students will have the opportunity to draft simple wills, medical directives, and deeds in behalf of actual clients.

**786.Government and Legislative Representation. (3)**

Students participate in simulated exercises to review and draft legislation, to prepare legislative findings and "records" to support draft legislation and to prepare oral presentations of their work.

**787.Community and Economic Development Representation. (3)**

Students participate in simulated exercises on transactional matters which are commonly addressed through local community/economic development and redevelopment efforts. Students will have the opportunity to role play advising clients.

**788R.Law School Clinic. (1-4)**

Prerequisite(s): First-year law courses. Additional requirements may apply independently for each Law School Clinic.

Live-client interactions under the supervision of seasoned practitioners. Emphasis on the development of professional skills, including legal research and writing, counseling, interviewing, negotiation, mediation, and problem solving.

**790R.Directed Research. (1-2)**

Prerequisite(s): First-year law courses.

**791R.Directed Readings. (1-2)**

Prerequisite(s): First-year law courses.

**792R.Cocurricular Programs. (1)**

Prerequisite(s): First-year law courses.

**793R.Cocurricular-- Special Assignments. (1-2)**

Prerequisite(s): First-year law courses; participation in cocurricular programs.

**795R.Law School Seminar. (1-18)**

Prerequisite(s): First-year law courses.

**796R.Law School Seminar. (1-18)**

Prerequisite(s): First-year law courses.

**798R.LLM Thesis. (1-6)**

Prerequisite(s): Completion of fall semester LLM program.

**FACULTY**

**Augustine-Adams, Kif Charles**

*E. Jones Professor of Law, JD, Harvard University, 1992. Public International Law; Race and Race Relations; Social Policy and Feminist Legal Thought; Fourteenth Amendment; Torts*



**Daniels, Brigham** *Associate Professor of Law*, JD, Stanford University, 2003; PhD, Duke University Sc. 2003, . Legislation and Regulation; Property Law; Environmental Law; Water Law

**Durham Jr., W. Cole** *Susa Young Gates University Professor of Law; Director, Center for Law and Religion Studies*, JD, Harvard University, 1975. Comparative Constitutional Law; Contemporary Legal Theory; International Protection of Religious Freedom; Law and Religion in the United States

**Farmer, Larry C.** *Marion G. Romney Professor of Law*, PHD, Brigham Young University, 1975. Computer-Based Practice Systems; Legal Interviewing and Counseling

**Fee, John E.** *Professor of Law*, JD, University of Chicago, 1995. Land-Use Planning; Property; State and Local Government; Structures of the Constitution

**Fleming Jr., J. Clifton** *Ernest L. Wilkinson Chair and Professor of Law*, JD, George Washington University, 1967. European Union Law; Federal Taxation; International Taxation; Public International Law

**Gedicks, Frederick M.** *Guy Anderson Chair and Professor of Law*, JD, University of South California, 1980. Federal Courts; Structures of the Constitution; Fourteenth Amendment; Freedom of Religion; Substantive Due Process

**Gerdy, Kristin** *Teaching Professor and Director, Rex E. Lee Advocacy Program*, JD, Brigham Young University, 1995. Introduction to Advocacy; Introduction to Legal Research and Writing; Advanced Appellate Brief Writing; Public Speaking for Lawyers

**Gordon III., James D.** *Marion B. and Rulon A. Earl Professor of Law*, JD, University of California, Berkeley, 1980. Professional Responsibility; Professional Seminar

**Hernandez III, Carl** *Associate Teaching Professor of Law*, JD/MPA, Brigham Young University, 1992. Civil Rights; Community and Economic Development Representation; Fundamental Lawyering Skills; Government and Legislative Representation

**Hoagland, Mary H.** *Assistant Dean of Career Services and External Relations*, PHD, Brigham Young University, 2007. Professional Development

**Jensen, Eric Talbot** *Associate Professor of Law*, JD, University of Notre Dame Law School, 1994. Criminal Law; Public International Law; Law of Armed Conflict

**Jones, RoNell Andersen** *Associate Professor of Law*, JD, The Ohio State University Moritz College of Law, 2000. First Amendment; Legislation and Regulation; Structures of the Constitution

**Moore, David H.** *Professor of Law*, JD, Brigham Young University, 1996. Civil Procedure; International Human Rights; Legal Scholarship; Public International Law

**Nielson, Aaron** *Associate Professor of Law*, JD, Harvard University, 2007. Civil Procedure; Administrative Law

**Nunez, Carolina** *Associate Professor of Law*, JD, Brigham Young University, 2004. Immigration Law; Professional Responsibility; Torts

**Preston, Cheryl Bailey** *Edwin M. Thomas Professor of Law*, JD, Brigham Young University, 1979. Business Organizations; Contracts; Cyberlaw

**Rasband, James R.** *Dean and Hugh W. Colton Professor of Law*, JD, Harvard University, 1989. International Environmental Law; Public Lands and Natural Resources; Torts; Water Law

**Scharffs, Brett G.** *Associate Dean for Research and Academic Affairs; Francis R. Kirkham Professor of Law; Associate Director, International Center for Law and Rel. Stud*, JD, Yale University, 1992. Business Organizations; Law and Religion in the United States; International Business Transactions; International Protection of Religious Freedoms; Law and Logic

**Smith, D. Gordon** *Associate Dean for Faculty and Curriculum and Glen L. Farr Professor of Law*, JD, University of Chicago, 1990. Business Organizations; Contracts; Corporate Finance; Law and Entrepreneurship; Securities Regulation

**Sun, Lisa Grow** *Associate Professor of Law*, JD, Harvard University, 1997. Disaster Law; Structures of the Constitution; Torts

**Wardle, Lynn D.** *Bruce C. Hafen Professor of Law*, JD, Duke University, 1974. Biomedical Ethics; Children and the Law; Civil Procedure; Conflict of Laws; Family Law; Origins of the Constitution

**Welch, John W.** *Robert K. Thomas University Professor of Law*, JD, Duke University, 1975. Ancient Laws in the Hebrew Bible and Book of Mormon; Joseph Smith and the Law; Law in New Testament; Tax-Exempt Organizations

**Worthen, Kevin J.** *University President and Hugh W. Colton Professor of Law*, JD, BYU, 1972. Professional Seminar

## LINGUISTICS AND ENGLISH LANGUAGE

**Chair:** Strong-Krause, Diane  
**Graduate Coordinator:** Elzinga, Dirk

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### THE PROGRAMS OF STUDY

The Department of Linguistics and English Language offers two graduate degrees: Linguistics MA and TESOL MA. Both MA degrees require an oral defense of a thesis. These programs continue to have a significant influence at Brigham Young University with its rich language resources, and in a world setting where the demand for skilled language professionals is at an all-time premium, especially in the areas of teaching English as a second or foreign language. Students enrolling in these graduate programs receive state-of-the-art instruction in both the theoretical and applied aspects of linguistics.

### Linguistics - MA

The purpose of the linguistics MA program is closely related to the department's definition of linguistics, which is the scientific study of language. The program aims to prepare the student to become a language professional, go on to a PhD program, or go into the world as a competent practitioner of the skills expected of a linguist. A more applied, but popular emphasis in the department is a track that combines linguistics with computer skills. The linguistics curriculum develops such skills as analyzing language in its sound, structure, and meaning. Optional tracks also introduce the student to such related fields as anthropological linguistics, information design, sociolinguistics, and language-oriented computing.

### Requirements for Degree.

- Total credit hours: 33
- Required courses:  
Foundation (9 hours): Ling 601, 602, 603
- Research core (3 hours): Ling 604
- Electives (15 hours): To be selected depending on course availability and in consultation with faculty advisors
- Thesis (6 hours)
- Examination: oral defense of thesis (consult department for details).

### Teaching English to Speakers of Other Languages - MA

#### Requirements for MA TESOL Degree for 2012 admits

#### Thesis Option

- Credit hours (36): minimum 30 course work hours plus 6 thesis hours (Ling 699R); 27 hours of core courses with 3 elective hours and 6 thesis hours.
- Required courses: Ling 601, 602, 603, 610, 611, 612, 620, 640, 660, 695, 699R
- Elective: 1 elective course (3 hours) from Ling 675, 677, 678 and 679.
- Thesis - LING 699R (6 hours).
- Oral defense of thesis.

#### Requirements for MA TESOL Degree for 2013 and 2014 admits

- Credit hours (40): minimum 34 course work hours plus 6 thesis hours (Ling 699R).
- Required courses: Ling 601, 602, 603, 610, 611, 612, 620, 640, 660, 695, 699R
- Electives: 6 elective hours chosen from two categories:  
 Category 1: 3 hours from Ling 670 or 671  
 Category 2: 3 hours from Ling 677 or 678 or 679

- Thesis - LING 699R (6 hours).
- Oral defense of thesis.

For a more detailed description of the graduate program requirements, see <http://linguistics.byu.edu>.

### FINANCIAL ASSISTANCE

Financial assistance has been available over the past several years, particularly in the form of partial-tuition scholarships. One of the benefits that comes to both linguistics and TESOL students is the fact that many professors use teaching and research assistants. Also, many of those studying TESOL have the opportunity to become teaching assistants or part-time teachers at the English Language Center, where there are about twenty graduate student teachers.

### RESOURCES AND OPPORTUNITIES

### COURSE DESCRIPTION

#### ELANG

**521R.Studies in Language.** (3)  
 Prerequisite(s): ELANG 223; or LING 201; or equivalent.  
 Topics vary.

**521R.English Spelling.** (3)  
 Prerequisite(s): ELANG 223; or LING 201; or equivalent.

**522.Language Policy and Planning in English Language Contexts.** (3)  
 Prerequisite(s): ELANG 223; or LING 201; or equivalent.  
 Theories and practices of governing entities as they formulate policies relating to the status and codification of the English language.

**524.History of the Book.** (3)  
 History and development of the book, including modern methods and practices.

**525.Old English 1. (3)**

Prerequisite(s): ELANG 324; or equivalent.

Old English grammar and vocabulary; traditional syntactical patterns in various types of Old English prose and poetry.

**526.Middle English. (3)**

Prerequisite(s): ELANG 324; or equivalent.

Detailed study of the principal dialects of Middle English, as illustrated in the literature of the period.

**527.Early Modern English. (3)**

Prerequisite(s): ELANG 324; or equivalent.

English language from about 1500 to 1800, with special emphasis on language of Shakespeare and the King James Bible.

**528.Varieties of English. (3)**

Prerequisite(s): ELang 223, 324; or equivalents.

Regional and social variation in English, especially standard and nonstandard national and world Englishes, including English-based pidgins and creoles.

**529.Structure of Modern English. (3)**

Prerequisite(s): ELANG 325; or instructor's consent.

English syntax through modern grammars; theories underlying those grammars.

**535.Language and Literature. (3)**

Prerequisite(s): ELANG 223; or LING 201; or equivalent.

Literature from a language perspective; applying linguistic constructs to literary language; examining literary style; linguistic analysis of unfamiliar texts.

**548.Old English 2. (3)**

Prerequisite(s): ELANG 525

Additional reading in Old English, emphasizing sound changes, dialects, and textual production.

**LING****501.Advanced Research and Writing Techniques for Second Language Writers. (3)**

Prerequisite(s): For graduate international ESL students.

Non-native English speaking students will develop research and writing techniques necessary for graduate-level writing.

**542.Field Methods in Linguistics. (3)**

Documenting an unfamiliar language by interacting with a native speaker.

**545.Psycholinguistics. (3)**

Prerequisite(s): For Fall 2013 & forward admits, Ling 201 or ELang 223; or equivalent.

How the mind interprets, stores, retrieves, and produces language. Anatomical structures and physiological processes of the brain dealing with language.

**550.Sociolinguistics. (3)**

Research and theory on the effect of language on society and society on language use.

**551.Anthropological Linguistics. (3)**

Prerequisite(s): For Fall 2013 & forward admits, Ling 220 and Ling 230; or equivalent.

Language in culture and society: development, typology, and description.

**558.Historical-Comparative Linguistics. (3)**

Prerequisite(s): Ling 450 or equivalent.

Learning theory and method of language change via comparing daughter languages and reconstructing ancestral languages. Language universals and typology.

**580R.Problems in Linguistics and Applied Linguistics. (1-3)**

Advanced research in language acquisition, sociolinguistics, psycholinguistics, linguistics field study, applied linguistics.

**581.Natural Language Processing. (3)**

Prerequisite(s): Good programming skills in at least one language (preferably LISP, Prolog, C, C++, Perl, or Java) and a knowledge of basic discrete math. Upper-division linguistics/computers and the humanities students with less programming experience may enroll with ins

Intensive overview of natural language processing, including computational techniques, hands-on experience with linguistic technologies and corpora, language modeling approaches, and readings from current research.

**590R.Readings in Linguistics. (1-3)**

Prerequisite(s): Instructor's consent.

Individual study of current linguistic literature. Occasional discussion sessions with instructor and other class members.

**599R.Academic Internship: Linguistics. (1-9)**

On-the-job experience under faculty supervision, with department approval.

**601.Linguistic Foundations: Sounds of Language. (3)**

Prerequisite(s): Ling 330 or ELang 223 or equivalent experience.

Principles of phonetics and phonology emphasizing analytical procedures and applications to real world language problems.

**602.Linguistic Foundations: Structures of Language. (3)**

Prerequisite(s): Ling 330 or ELang 223 or equivalent experience.

Principles of morphology and syntax emphasizing analytical procedures and applications to real world language problems.

## **603.Linguistic Foundations: Meanings in Language. (3)**

Prerequisite(s): Ling 330 or ELang 223 or equivalent experience.

Principles of semantics and pragmatics emphasizing analytical procedures and applications to real world language problems.

## **604.Research Design in Linguistics. (3)**

Prerequisite(s): LING 601 & LING 602 & LING 603

Overview of, and experience in, research approaches and methodologies in linguistics and applied linguistics with a concentration on department faculty research interests.

## **610.TESOL Methods and Materials Overview. (3)**

Prerequisite(s): Admission to the TESOL graduate program.

Foundation course surveying concepts, procedures, and techniques in second/foreign language teaching methodology and materials selection. Includes observing ESL classes in various contexts.

## **611.TESOL Methods and Materials Application. (3)**

Prerequisite(s): LING 610

Practical application of language teaching methods and materials, including materials development and selection and technology for use in a mentored teaching practicum.

## **612.TESOL Practicum. (3)**

Prerequisite(s): LING 610

Sustained and supervised practice teaching at the English Language Center.

## **615.Analogical Modeling of Language. (3)**

Prerequisite(s): Ling 330 or equivalent.

Nondeclarative approaches to language description; work within the connectionist or neural net framework; analogical or exemplar modeling.

## **620.Research in TESOL. (3)**

Prerequisite(s): LING 612

Analyzing and interpreting published research for language teachers, writing a review of literature, recognizing various research approaches and assessing their appropriateness, and designing empirical research that is both valid and reliable.

## **631.Grammar Theory and Pedagogy. (3)**

Prerequisite(s): LING 603 & LING 612

Examining English grammar and usage as they reflect different theories about language description and applying this knowledge in the ESL/EFL classroom.

## **640.Language Acquisition. (3)**

Prerequisite(s): Ling 603 and 612.

First- and second-language acquisition viewed in light of psycholinguistics and sociolinguistics.

## **651.Advanced Phonology. (3)**

Prerequisite(s): LING 601

Study of sound systems of natural languages using current methods and theories.

## **652.Advanced Morphology. (3)**

Prerequisite(s): LING 602

Morphological theory and applications including the lexicon, inflectional and derivational processes, compounding, valency, lexical conceptual and argument structure, morphophonology and morphosyntax, learnability, and modeling.

## **653.Advanced Syntax. (3)**

Prerequisite(s): LING 602

Theory of generative grammar, emphasizing its history, the competition between different versions of generative theory, and their recent extensions.

## **654.Advanced Semantics. (3)**

Prerequisite(s): LING 603

Semantic theory and applications including quantification, modality, aspect, presupposition, contexts, focus, polarity, and pragmatics.

## **655.Culture Teaching. (3)**

Prerequisite(s): LING 603 & LING 612

Learning what culture is and how it functions in society. Practicing techniques and creating materials for teaching culture in ESL/EFL and foreign language classrooms.

## **660.Language Testing. (3)**

Prerequisite(s): LING 603 & LING 612

Construction, analysis, use, and interpretation of language tests.

## **670.TESOL Teaching Skills: Reading, Writing, & Vocabulary. (3)**

Prerequisite(s): Ling 610.

Processes involved in reading, writing, and vocabulary acquisition, emphasizing how these skills are developed in a second/foreign language.

## **671.TESOL Teaching Skills: Listening, Speaking, and Pronunciation. (3)**

Prerequisite(s): Ling 610.

Processes involved in listening and speaking in a second language. Application of phonetic and phonemic study of American English pronunciation will be included.

## **677.Curriculum Development. (2-3)**

Prerequisite(s): LING 612

Advanced language-teaching methodology and its classroom application.

## **678.Advanced Materials Development. (2-3)**

Prerequisite(s): LING 612

Principles and procedures for designing, developing, and evaluating professional-quality language teaching/learning materials for various types: textbooks, software, audiovisual aids, etc.



**679.TESOL Supervision-Administration Practicum.** (2-3)

Prerequisite(s): LING 612

Actual fieldwork in TESOL settings involving supervision, in-service training, and program administration.

**688R.Academic Internship: TESOL.** (0.5-9)

Prerequisite(s): LING 603 &amp; LING 612

Supervised field experience involving English language teaching, testing, or materials development in an approved domestic or international setting.

**695.TESOL Seminar.** (1)

Prerequisite(s): Completion of majority of TESOL MA courses and not-yet-defended thesis or project.

Integrating TESOL theory and practice; final preparation for TESOL career paths; refining and publicly presenting and defending thesis or project results.

**698R.Master's Project.** (1-3)

Prerequisite(s): Ling 660 or 678 for TESOL MA students.

Design, production, and evaluation of MA project in Linguistics or TESOL. May involve various media: paper/print, computer software, audio recordings, or video recordings. Supervised by graduate advisory committee chair.

**699R.Master's Thesis.** (1-9)**FACULTY**

**Chapman, Don W.** *Associate Professor*, PhD, University of Toronto, Canada, 1995. Old English Language and Literature; History of the English Language; Medieval Literature

**Clifford, Ray T.** *Associate Dean*, PhD, University of Minnesota, Minneapolis, 1977. Language Acquisition; Language Testing

**Davies, Mark** *Professor*, PhD, University of Texas, Austin, 1992. Corpus Design and Use; Linguistic Databases; Historical Syntax and Syntactical Variation; Spanish and Portuguese

**Dewey, Dan** *Associate Professor*, PhD, Carnegie Mellon, 2002. Second Language Acquisition; Language Acquisition, Japanese

**Eddington, David** *Professor*, PhD, University of Texas, Austin, 1993. Experimental Linguistics; Phonology; Morphology; Spanish

**Eggington, William G.** *Professor*, PhD, University of South California, 1985. Varieties of English; Contrastive Rhetoric; Language Policy

**Elzinga, Dirk A.** *Associate Professor*, PhD, University of Arizona, 1999. Phonological Theory and Analysis; Uto-Aztecan Languages

**Evans, Norman** *Associate Professor*, EdD, University of Southern California, 2001. Writing in a Second Language; Curriculum Development; Language Program Administration and Assessment

**Gardner, Dee** *Associate Professor*, PhD, Northern Arizona University, 1999. ESL Literacy; Applied Corpus Linguistics/ Vocabulary Acquisition

**Hallen, Cynthia** *Associate Professor*, PhD, University of Arizona, 1991. Rhetoric, Lexicography; Philology; Stylistics; Poetics

**Henrichsen, Lynn E.** *Professor*, EdD, University of Hawaii, 1987. TESOL; Methodology; Materials Development; Teacher Education; ESL K-12; EFL

**Lonsdale, Deryle** *Associate Professor*, PhD, Carnegie Mellon University, 1997. Formal Syntax and Semantics; Computational Linguistics; Salish Languages

**Manning, Alan** *Professor*, PhD, Louisiana State University, 1988. Linguistics Theory; Information Design; Syntax

**Nuckolls, Janis** *Associate Professor*, PhD, University of Chicago, 1990. Quichua Grammar; Ideophony; Morphology; Anthropological Linguistics; Cultural Semantics; Discourse Pragmatics

**Oaks, Dallin D.** *Associate Professor*, PhD, Purdue University, 1990. English Linguistics; Structure of English; Ambiguity; Old English Language

**Skousen, Royal** *Professor*, PhD, University of Illinois, 1972. Analogical Modeling; Textual Criticism

**Baker Smemoe, Wendy** *Associate Professor*, PhD, University of Illinois, Urbana-Champaign, 2002. Second Language Acquisition; Psycholinguistics; Phonetics; Speech Perception and Production

**Sturman, Heather** *Assistant Professor*, PhD, University of California, Los Angeles, 2008. Syntax, K'iche; Marshallese

**Tanner, Mark** *Assistant Professor*, PhD, University of Pennsylvania, 1991. Language Acquisition; TESOL; Sociolinguistics

## MATHEMATICS

**Chair:** Roundy, Robin

**Graduate Coordinator:** Humphries, Stephen P.

**Associate Chair:** Wright, David G.

**Associate Chair:** McKay, Steven M.

275 TMCB, Provo, UT 84602-6539  
(801) 422-2062

[gradschool@math.byu.edu](mailto:gradschool@math.byu.edu)

<http://www.math.byu.edu>

## THE PROGRAMS OF STUDY

The Department of Mathematics has approximately thirty-five graduate students, most of whom are supported by teaching assistantships. These students receive help with tuition as well as a stipend for the teaching support they provide in mathematics department service courses.

Two degrees are offered through the Department of Mathematics: Mathematics-MS; and Mathematics-PhD.

MS students study mathematics courses in preparation for careers in business, industry, government, or education. Other students use a master's degree in mathematics in preparation for a doctoral degree in mathematics or a closely related discipline or a discipline where technical competence is appreciated. Master's students graduate in an average of two years.

The PhD program requires about four years beyond a master's degree. The topic for a PhD dissertation may be chosen from faculty specialties, which include applied mathematics, algebraic geometry, geometric analysis, dynamical systems, number theory, geometric and low-dimensional topology, mathematical biology, group theory, algebra, and operations research.

### Mathematics - MS

Graduate mathematics courses: approved graduate mathematics courses include all classes numbered

above 500. Temporary advisor: upon admission to the graduate program, the graduate coordinator will assign each student a temporary advisor until the student chooses a permanent one. Students should communicate with their advisors as soon as they arrive on campus.

### Requirements for Degree-Thesis Program.

- **Credit hours** (30): minimum 24 course work hours in approved graduate mathematics with a grade of C+ or better in each and six thesis hours (Math 699R). Twelve of the course hours must be from 600-level courses.
- **Examinations:** Each student must pass a written master's examination consisting of two 4-hour tests, namely an algebra exam and an analysis exam, essentially covering material from Math 313; Math 371; Math 372 or Math 473 for algebra, and Math 341; Math 342; Math 352 for analysis.

These exams will be administered 3 times per year. Both exams must be passed within the first year of matriculation in order for financial support to continue. This means that students will have three attempts to pass these exams. With permission, however, undergraduates and other prospective graduate students can take and pass the exam early, prior to matriculation.

Exams will typically be scheduled during the week prior to the start of classes for Fall and Winter terms, usually the last week of August and first week of January. It will also be administered in mid to late February, usually during the President's day weekend. It is expected that exams will be graded and returned to the students within a week. Students will be encouraged to discuss the results of the exam with their advisors to decide which classes to take.

If students do not pass both exams by the end of their first academic year, financial support will be discontinued at the end of that semester. For example, if

students fails his third attempt in February, then the student will not be financially supported in the following spring and summer terms.

- **Thesis.** Each student in the program is required to write a thesis on a mathematical topic at a level well beyond what they encounter in the classroom. The master's thesis usually includes an introductory chapter that is a comprehensive survey of the literature on the student's research topic.
- **Oral defense of thesis.** Upon completion of the thesis and before graduation, the student is required to give an oral presentation of his work.

### Requirements for Degree-Nonthesis Program.

- **Credit hours:** (32): minimum 30 course work hours in approved graduate mathematics, with a grade of C+ or better in each and two hours for the project (698R). Eighteen course hours must be taken from courses numbered 600 or above. No credit is given for prerequisite courses such as Math 342 or Math 372.
- **Examinations:** Each student must pass a written master's examination consisting of two 4-hour tests, namely an algebra exam and an analysis exam, essentially covering material from Math 313; Math 371; Math 372 or Math 473 for algebra, and Math 341; Math 342; Math 352 for analysis.

These exams will be administered 3 times per year. Both exams must be passed within the first year of matriculation in order for financial support to continue. This means that students will have three attempts to pass these exams. With permission, however, undergraduates and other prospective graduate students can take and pass the exam early, prior to matriculation.

Exams will typically be scheduled for the week prior to the start of classes for Fall and Winter terms,

usually the last week of August and first week of January. It will also be administered in mid to late February, usually during the President's day weekend. It is expected that exams will be graded and returned to the students within a week. Students will be encouraged to discuss the results of the exam with their advisors to decide which classes to take.

If students do not pass both exams by the end of their first academic year, financial support will be discontinued at the end of that semester. For example, if a student fails his third attempt in February, then the student will not be financially supported in the following spring and summer terms.

- **Project, Paper and Presentation:** Complete a project (Math 698R) focused on an area of advanced mathematics, write a paper about the project, and present a 45-minute talk based on the paper.

### Mathematics - PhD

The doctoral program prepares students for a career in research and teaching at the university level or in basic research in a nonacademic setting.

#### Requirements for Degree.

- Credit hours (54): minimum 36 course work hours in mathematics courses numbered 600 or above with a grade of B or better in each, plus 18 dissertation hours (Math 799R).
- Required courses: complete at least 3 hours each in algebra, analysis, applied mathematics, and geometry/topology.
- Examinations: *Written Examinations:* In their first and second years the student needs to pass three qualifying exams. One of these must be in algebra or analysis; the student and his/her committee will determine the others. The material tested will be from Math 540/641 for analysis and Math 572/673 for algebra. For topology the courses would be Math 554/656. These

exams will be offered in January, May and August of each year. Four hours are allotted to each examination. Syllabi are available for each examination.

- *Dissertation.* A student seeking a doctor of philosophy degree must register for and complete a minimum of 18 hours of dissertation credit. No more than 18 hours may count toward the 54 hours required, and all 18 hours may not be taken in one term or semester. Registration for dissertation credit and work on the dissertation must be concurrent.
- *Defense of Dissertation:* A final oral defense of the dissertation is conducted by a faculty committee consisting of the student's research adviser, two other readers of the dissertation (one of whom may be an outside examiner) and two other members of the faculty.

### FINANCIAL ASSISTANCE

Most of the graduate students in mathematics are supported by teaching assistantships. Current teaching assistants generally receive a salary as well as tuition support. For exact amounts of financial support and other details, contact the Mathematics Department online at <http://www.math.byu.edu/graduate> or by e-mail at [gradschool@math.byu.edu](mailto:gradschool@math.byu.edu).

### RESOURCES AND OPPORTUNITIES

Faculty research interests currently include: algebra, algebraic geometry, applied mathematics, combinatorial and geometric group theory, dynamical systems, geometric and low-dimensional topology, mathematical biology, matrix analysis, number theory, numerical analysis, and partial differential equations.

*For a more detailed description of the graduate program requirements, see [www.math.byu.edu/graduate](http://www.math.byu.edu/graduate).*

### COURSE DESCRIPTION

#### MATH

#### 500.(Math-Chem-C S-Geol-MthEd-Phscs-Stat) Business Career Essentials in Science and Math. (1.5)

Introduction for science, math, and statistics majors to careers in industry. Project planning, oral and written business presentations, business accounting, and technology readiness.

#### 510.Numerical Methods for Linear Algebra. (3)

Prerequisite(s): Math 410 or equivalent.

Numerical matrix algebra, orthogonalization and least squares methods, unsymmetric and symmetric eigenvalue problems, iterative methods, advanced solvers for partial differential equations.

#### 511.Numerical Methods for Partial Differential Equations. (3)

Prerequisite(s): Math 303 or 447; 410; or equivalents.

Finite difference and finite volume methods for partial differential equations. Stability, consistency, and convergence theory.

#### 513R.Advanced Topics in Applied Mathematics. (3)

Prerequisite(s): Instructor's consent.

#### 521.Methods of Applied Mathematics 1. (3)

Prerequisite(s): Math 334 or equivalent.

Possible topics include variational, integral, and partial differential equations; spectral and transform methods; nonlinear waves; Green's functions; scaling and asymptotic analysis; perturbation theory; continuum mechanics.

## 522.Methods of Applied Mathematics 2. (3)

Prerequisite(s): Math 521 or equivalent.

Possible topics include variational, integral, and partial differential equations; spectral and transform methods; nonlinear waves; Green's functions; scaling and asymptotic analysis; perturbation theory; continuum mechanics.

## 532.Complex Analysis. (3)

Prerequisite(s): Math 352 or instructor's consent.

Introduction to theory of complex analysis at beginning graduate level. Topics: Cauchy integral equations, Riemann surfaces, Picard's theorem, etc.

## 534.Introduction to Dynamical Systems 1. (3)

Prerequisite(s): Math 334, 341; or equivalents.

Discrete dynamical systems; iterations of maps on the line and the plane; bifurcation theory; chaos, Julia sets, and fractals. Computational experimentation.

## 540.Linear Analysis. (3)

Normed vector spaces and linear maps between them.

## 541.Real Analysis. (3)

Prerequisite(s): Math 341; 314 or 342; or equivalents.

Rigorous treatment of differentiation and integration theory; Lebesgue measure; Banach spaces.

## 543.Advanced Probability 1. (3)

Prerequisite(s): Math 314 and Math 341; and Math 431 or Stat 370; or equivalents.

Foundations of the modern theory of probability with applications. Probability spaces, random variables, independence, conditioning, expectation, generating functions, and Markov chains.

## 544.Advanced Probability 2. (3)

Prerequisite(s): MATH 543

Advanced concepts in modern probability. Convergence theorems and laws of large numbers. Stationary processes and ergodic theorems. Martingales. Diffusion processes and stochastic integration.

## 547.Partial Differential Equations 1. (3)

Prerequisite(s): Math 334, 342; or equivalents.

Methods of analysis for hyperbolic, elliptic, and parabolic equations, including characteristic manifolds, distributions, Green's functions, maximum principles and Fourier analysis.

## 553FOUNDATIONS OF TOPOLOGY 1. (3)

Prerequisite(s): Math 341 or equivalent.

Naive set theory, topological spaces, product spaces, subspaces, continuous functions, connectedness, compactness, countability, separation axioms, metrization, complete metric spaces, function spaces, and Baire spaces.

## 554.FOUNDATIONS OF TOPOLOGY 2. (3)

Prerequisite(s): Math 553 or instructor's consent.

Fundamental group, retractions and fixed points, homotopy types, separation theorems, classification of surfaces, Seifert-van Kampen Theorem, classification of covering spaces, and applications to group theory.

## 561.Introduction to Algebraic Geometry 1. (3)

Prerequisite(s): Math 571 or concurrent enrollment.

Basic definitions and theorems on affine, projective, and quasi-projective varieties.

## 565.Differential Geometry. (3)

Prerequisite(s): Math 342 or equivalent.

A rigorous treatment of the theory of differential geometry.

## 570.Matrix Analysis. (3)

Prerequisite(s): Math 302 or 313 or equivalent.

Special classes of matrices, canonical forms, matrix and vector norms, localization of eigenvalues, matrix functions, applications.

## 571.Algebra 1. (3)

Prerequisite(s): Math 372 or equivalent.

Group theory, ring theory.

## 572.Algebra 2. (3)

Prerequisite(s): MATH 571

Modules, vector spaces, field theory, Galois theory.

## 586.Introduction to Algebraic Number Theory. (3)

Prerequisite(s): Math 372 or equivalent.

Algebraic integers; different and discriminant; decomposition of primes; class group; Dirichlet unit theorem; Dedekind zeta function; cyclotomic fields; valuations; completions.

## 587.Introduction to Analytic Number Theory. (3)

Prerequisite(s): Math 352 or equivalent.

Arithmetical functions; distribution of primes; Dirichlet characters; Dirichlet's theorem; Gauss sums; primitive roots; Dirichlet L-functions; Riemann zeta-function; prime number theorem; partitions.

## 621.Matrix Theory 1. (3)

Prerequisite(s): MATH 570

Symmetric matrices, spectral graph theory, interlacing, the Laplacian matrix of a graph.



**622.Matrix Theory 2. (3)**

Prerequisite(s): MATH 621

Research topics in combinatorial matrix theory.

**634.Theory of Ordinary Differential Equations. (3)**

Prerequisite(s): Math 334, 341; or equivalents.

**635.Dynamical Systems. (3)**

Prerequisite(s): MATH 634

**640.Nonlinear Analysis. (3)**

Differential calculus in normed spaces, fixed point theory, and abstract critical point theory.

**641.Functions of a Real Variable. (3)**

Prerequisite(s): Math 541 or instructor's consent.

Abstract measure and integration theory;  $L(p)$  spaces; measures on topological and Euclidean spaces.

**643R.Special Topics in Analysis. (3)**

Prerequisite(s): Math 641 or instructor's consent.

Advanced topics in analysis drawn from pure and applied mathematics.

**647.Theory of Partial Differential Equations 1. (3)**

Prerequisite(s): MATH 541 & MATH 547

**651.Topology 1. (3)**

Prerequisite(s): MATH 553 & MATH 554

Advanced topics in topology. Topics may include, but are not limited to, piecewise linear topology, 3-manifold theory, homotopy theory, differential topology, Riemannian geometry, and geometric group theory.

**652.Topology 2. (3)**

Prerequisite(s): MATH 651

Advanced topics in topology. Topics may include, but are not limited to, piecewise linear topology, 3-manifold theory, homotopy theory, differential topology, Riemannian geometry, and geometric group theory.

**655.Differential Topology. (3)**

Prerequisite(s): Math 342 or equivalent; Math 553 or equivalent.

Topological and smooth manifolds, tangent vectors, vector bundles, cotangent bundles, submersions, immersion, and embeddings of submanifolds, transversality, embedding and approximation theorems, differential forms, wedge products, exterior derivative, orientation, Stokes' theorem and integration on manifolds.

**656.Algebraic Topology. (3)**

Prerequisite(s): MATH 553

Fundamental group and homotopy, Von Kampen theorem, covering spaces, group actions, higher homotopy; simplicial, singular, and cellular homology, homology with coefficients, exact sequences, excision, Mayer-Vietoria; cohomology, universal coefficients, cup product, Poincare duality.

**663.Algebraic Geometry 1. (3)**

Prerequisite(s): Math 676 or concurrent enrollment.

Basic definitions and theorems on varieties, sheaves, and schemes.

**664.Algebraic Geometry 2. (3)**

Prerequisite(s): MATH 663

Cohomology of schemes. Classification problems. Applications.

**673.Algebra 3. (3)**

Prerequisite(s): Math 572 or equivalent.

Topics from representation theory of finite groups and associative algebras. Groebner bases, homological algebra, tensor algebras, commutative rings, advanced finite group theory.

**674.Lie Groups and Algebras. (3)**

Prerequisite(s): MATH 673

Basic concepts of Lie Groups and algebras including root systems, algebraic groups, and representation theory.

**675R.Special Topics in Algebra. (3)**

Prerequisite(s): MATH 572

**676.Commutative Algebra. (3)**

Prerequisite(s): MATH 572

Commutative rings, modules, tensor products, localization, primary decomposition, Noetherian and Artinian rings, application to algebraic geometry and algebraic number theory.

**677.Homological Algebra. (3)**

Prerequisite(s): MATH 572

Chain complexes, derived functors, cohomology of groups, ext and tor, spectral sequences, etc. Application to algebraic geometry and algebraic number theory.

**686R.Topics in Algebraic Number Theory. (3)**

Prerequisite(s): MATH 372; Permission of the instructor.

Current topics of research interest.

**687R.Topics in Analytic Number Theory. (3)**

Prerequisite(s): Math 352, 487; or equivalents.

Current topics of research interest.

**695R.Readings in Mathematics. (1-2)**

**698R.Master's Project. (2)**

**699R.Master's Thesis. (1-9)**

## MATHEMATICS

### 751R.Advanced Special Topics in Topology. (3)

Prerequisite(s): MATH 652

Current topics in topology of research interest.

### 799R.Doctoral Dissertation. (1-9)

## FACULTY

**Baker, Roger C.** *Professor*, PhD, University of London, 1971. Number Theory

**Bakker, Lennard F.** *Associate Professor*, PhD, Queens University, 1997. Dynamical Systems; Celestial Mechanics

**Cardon, David A.** *Professor*, PhD, Stanford University, 1996. Number Theory

**Chahal, Jasbir S.** *Professor*, PhD, Johns Hopkins University, 1979. Number Theory

**Chow, Shue-Sum** *Associate Professor*, PhD, Australian National University, 1983. Numerical Analysis

**Conner, Gregory R.** *Professor*, PhD, University of Utah, 1992. Geometric Group Theory; Combinatorial Group Theory; Topology

**Dallon, John C.** *Professor*, PhD, University of Utah, 1996. Mathematical Biology

**Dorff, Michael J.** *Professor*, PhD, University of Kentucky, 1997. Geometric Function Theory; Complex Analysis; Minimal Surfaces

**Doud, Darrin M.** *Professor*, PhD, University of Illinois, 1999. Number Theory

**Evans, Emily J.** *Assistant Professor*, PhD, Worcester Polytechnic Institute, 2011. Applied Mathematics; Numerical Analysis

**Fisher, Todd** *Associate Professor*, PhD, Northwestern University, 2004. Dynamical Systems

**Forcade, Rodney W.** *Professor*, PhD, University of Washington, 1971. Combinatorics

**Glasgow, Scott A.** *Associate Professor*, PhD, University of Arizona, 1993. Optics; Classical and Quantum

**Grant, Christopher P.** *Associate Professor*, PhD, University of Utah, 1991. Nonlinear Partial Differential Equations; Dynamical Systems

**Halverson, Denise M.** *Professor*, PhD, University of Tennessee, 1999. Geometric Topology

**Humpherys, Jeffrey C.** *Associate Professor*, PhD, Indiana University, 2002. Applied Mathematics

**Humphries, Stephen P.** *Professor*, PhD, University of Wales, 1983. Low-Dimensional Topology; Classical Groups; Representation Theory

**Jarvis, Tyler J.** *Professor*, PhD, Princeton University, 1994. Algebraic Geometry

**Jenkins, Paul** *Associate Professor*, PhD, University of Wisconsin-Madison, 2006. Number Theory; Modular Forms; Partitions

**Kuttler, Kenneth L.** *Professor*, PhD, University of Texas, Austin, 1981. Abstract Methods for Nonlinear Partial Differential Equations and Inclusion

**Lawlor, Gary R.** *Associate Professor*, PhD, Stanford University, 1988. Geometric Measure Theory and Area Minimization

**Li, Xian-Jin** *Professor*, PhD, Purdue University, 1993. Number Theory

**Lu, Kening** *Professor*, PhD, Michigan State University, 1988. Applied Mathematics; Nonlinear Partial Differential Equations; Dynamical Systems

**Nielsen, Pace** *Assistant Professor*, PhD, University of California, Berkeley, 2006. Algebra; Number Theory

**Ouyang, Tiancheng** *Professor*, PhD, University of Minnesota, 1989. Partial Differential Equations

**Purcell, Jessica S.** *Associate Professor*, PhD, Stanford University, 2004. Three-Dimensional Manifolds; Hyperbolic Geometry; Knot Theory

**Roundy, Robin O.** *Professor*, PhD, Stanford University, 1984. Operations Research

**Swenson, Eric L.** *Associate Professor*, PhD, Brigham Young University, 1993. Geometric Group Theory

**Villamizar, Vianey** *Associate Professor*, PhD, Rensselaer Polytechnic Institute, 1987. Applied Mathematics; Wave Scattering; Scientific Computing

**Webb, Benjamin** *Assistant Professor*, PhD, Georgia Institute of Technology, 2011. Dynamical Systems; Applied Mathematics

**Whitehead, Jared P.** *Assistant Professor*, PhD, University of Michigan, 2012. Applied Mathematics; Partial Differential Equations; Scientific Computing; Dynamical Systems

## MATHEMATICS EDUCATION

**Chair:** Peterson, Blake E.

**Associate Chair:** Siebert, Daniel K.

**Graduate Coordinator:** Corey,  
Douglas L.

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### THE PROGRAMS OF STUDY

The Department of Mathematics Education offers a program of graduate study that leads to a Master of Arts degree in Mathematics Education. Through the experiences this program offers, graduate students extend their own understanding of mathematics and deepen their understanding of learners' mathematical thinking. The department values close, detailed mentoring of each graduate student as an active member of the scholarly community - a community devoted to exploration and inquiry into the learning and teaching of mathematics. Our program emphasizes interactions with faculty (both in and out of the classroom) that (a) allow students to explore new mathematical understanding in both personal and social contexts; (b) immerse students deeply in exploration, inquiry, analysis and exposition; and (c) familiarize students with the ever-expanding body of research literature on learning and teaching mathematics and with prevailing research methodologies. The cumulative experiences of our program prepare graduates to enter top mathematics education doctoral programs, to take on important leadership roles in school mathematics education communities, and to return to classrooms better equipped to teach lessons that are informed by students' mathematical thinking.

### Mathematics Education - MA

Our program offers both thesis and project options.

#### Requirements for Degree-Thesis Program.

- Credit hours (30): minimum of 24 credit hours of approved course work plus 6 thesis hours (MthEd 699R).
- Required courses: MthEd 590, 591; and 3 credit hours of 611R; 9 additional credit hours of approved 500- or 600-level mathematics education coursework.
- Electives: 6 credit hours of approved graduate level coursework (no more than 3 credits of readings course 695R).
- Comprehensive examination: pass a written comprehensive examination. Full-time students take the exam in May following their first year; part-time students take the exam in May following their second year.
- Thesis: write a thesis based on an approved research project. Note: A formal thesis proposal and defense is required.
- Oral defense of thesis.
- Minor (optional): any approved minor.

#### Requirements for Degree-Project Program.

- Credit hours (30): minimum of 27 credit hours of approved coursework plus 3 project hours (Math 698R).
- Required courses: MthEd 590, 591; and 3 credit hours of 611R; 12 additional credit hours of approved 500- or 600-level mathematics education courses.
- Electives: 6 credit hours of approved graduate level coursework (no more than 3 credits of readings course 695R).

- Comprehensive examination: pass a written comprehensive examination. Full-time students take the exam in May following their first year; part-time students take the exam in May following their second year.
- Project paper: write a paper based on an approved project. Note: A formal project proposal and defense is required.
- Oral defense of project paper.
- Minor (optional): any approved minor.

### FINANCIAL ASSISTANCE

We see our graduate students as part of the department's active research and teaching community. Thus most full-time graduate students receive support from our department in the form of teaching assistantships. This support includes (a) a stipend, for which the recipient performs teaching duties requiring 20 hours per week and (b) a tuition scholarship for program courses. Information on current levels of support is available from the department.

### RESOURCES AND OPPORTUNITIES

The research interests and active projects of the mathematics education faculty touch all levels of mathematics learning and learners. Designed as "research internships in mathematics education," the MA program gives each graduate student opportunities to engage with faculty in one or more research settings.

See [www.mathed.byu.edu](http://www.mathed.byu.edu) for a more detailed description of the graduate program in mathematics education.

## COURSE DESCRIPTION

### MTHED

**500.(MthEd-Chem-C S-Geol-Math-Phscs-Stat) Business Practices for Science and Mathematics Majors.** (1.5)

(Math-Chem-C S-Geol-MthEd-Phscs-Stat) Introduction for science, math, and statistics majors to careers in industry. Project planning, oral and written business presentations, business accounting, and technology readiness.

**550.Problem Solving.** (3)

Prerequisite(s): Strong background in undergraduate mathematics; instructor's consent.

Solving and building explanations and presenting solutions to conceptually important problems. Analyzing research on problem solving and its role in teaching and learning mathematics.

**562.Euclidean Geometry: Content, Learning, and Teaching.** (3)

Prerequisite(s): MthEd 362 or equivalent.

Euclidean geometry, including classical problems, polyhedra, transformations, congruence, similarity, integer geometry, minimization; technology in geometry, Van Hiele levels, role of proof, and high school curriculum.

**590.Foundational Issues in Learning Mathematics.** (3)

Prerequisite(s): Teaching certificate or completion of student teaching.

Introduction to research in mathematics learning; mathematical thinking; cognitive, social, and philosophical approaches to describing mathematics learning.

**591.Scholarly Inquiry in Mathematics Education.** (3)

Prerequisite(s): MTHED 590

Introduction to scholarly inquiry in mathematics education; issues in research methodology.

**598R.Topics in Mathematics Education.** (0.5-3)

Prerequisite(s): Instructor's consent.

Includes specific research areas and curriculum studies of school mathematics topics (i.e. geometry, algebra, and calculus).

**608.Technology for Learning and Teaching Mathematics.** (3)

Prerequisite(s): BA in mathematics education or equivalent; MthEd 308 or equivalent.

Analyzing research relative to learning mathematics with technology; exploring mathematical problems using technology; design curriculum; conducting research in the learning and teaching of mathematics with technology.

**611R.Graduate Student Seminar.** (1)

Prerequisite(s): Instructor's consent.

Reading, discussing, and writing about relevant public discourse, policies, and issues in the broad arena of mathematics education.

**660.Number and Number Sense.** (3)

Prerequisite(s): BA in mathematics education or equivalent.

Research on children's understanding of early numbers, number operations, number sense, multidigit arithmetic, fractions, decimals, and proportions.

**661.Algebraic Reasoning.** (3)

Prerequisite(s): BA in mathematics education or equivalent.

Fundamental concepts (e.g., variables, equality, pattern recognition, function, covariation, equations), processes (e.g., mathematizing, generalizing, modeling), and research in algebraic reasoning.

**663.Calculus Teaching and Learning.** (3)

Prerequisite(s): BA in mathematics education or equivalent.

Fundamental calculus concepts as well as the curricula, reform efforts, and research associated with teaching and learning calculus.

**695R.Readings in Mathematics Education.** (0.5-3)

Prerequisite(s): Instructor's consent.

**698R.Master's Project.** (1-3)

Prerequisite(s): Instructor's consent.

**699R.Master's Thesis.** (0.5-9)

Prerequisite(s): Instructor's consent.

## FACULTY

**Corey, Douglas L.** *Associate*

*Professor*, PhD, University of Michigan, 2007. Interests include understanding the characteristics of high-quality mathematics instruction and understanding what mathematical knowledge is needed to help students develop mathematical understanding

**Johnson, Kate R.** *Assistant Professor*,

PhD, Michigan State University, 2013. Research interests are the identities of mathematics teachers in the context of teaching mathematics in ways that illuminate social inequity and empower students to seek social change



**Jones, Steven R.** *Assistant Professor*, PhD, University of Maryland, 2010. Research interests include focus on undergraduate mathematics and applying mathematics to science and engineering

**Leatham, Keith R.** *Associate Professor*, PhD, University of Georgia, 2002. Research interests include seeking to understand how preservice mathematics teachers learn to recognize and effectively use student mathematical thinking as a standard method for teaching mathematics

**Peterson, Blake E.** *Professor*, PhD, Washington State University, 1993. Research interests are on the process of learning to teach mathematics in the United States and in Japan

**Siebert, Daniel K.** *Associate Professor*, PhD, University of California, San Diego, 2000. Research interests include discourse and literacy in mathematics classrooms

**Teuscher, Dawn** *Assistant Professor*, PhD, University of Missouri-Columbia, 2008. Research interests include secondary mathematics teachers' mathematical knowledge for teaching and the effects of policy decisions in the mathematics education field

**Williams, Steven R.** *Professor*, PhD, University of Wisconsin, Madison, 1989. Research interests include advanced mathematical thinking (including calculus concepts, advanced algebra and proof), and sociocultural approaches to knowledge and classroom discourse

## MECHANICAL ENGINEERING

**Chair:** Maynes, R. Daniel  
**Graduate Coordinator:** Bowden, Anton E.

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<http://www.me.byu.edu>

### THE PROGRAMS OF STUDY

The Department of Mechanical Engineering offers strong graduate programs in a variety of areas, including combustion processes; computational and experimental fluid mechanics; dynamic and mechatronic systems and controls; heat transfer; product design and development; manufacturing systems and processes; materials and materials processing; optimization; micromechanical systems; biomechanics; aerospace; renewable energy; CAM/CAD; and robotics. Specific research activities in these areas are described on the Mechanical Engineering Department Web page at <http://www.me.byu.edu>.

The Mechanical Engineering Department offers two graduate degrees: Mechanical Engineering-PhD and Mechanical Engineering-MS.

The Mechanical Engineering Department and the Marriott School of Management offer a joint program leading to a master of science (MS) degree in mechanical engineering and a master of business administration (MBA) degree.

The graduate program in mechanical engineering has about 130 graduate students. The typical time required to obtain an MS degree is approximately two years, whereas a PhD degree usually requires about five years beyond the BS degree. The joint MS/MBA program generally takes about three years to complete.

### Joint Mechanical Engineering - MS/MBA

The Mechanical Engineering Department and the Marriott School of Management offer a joint program- leading to a master of science (MS) degree in mechanical engineering and a master of business administration (MBA) degree. The program provides advanced training in Mechanical Engineering along with management skills of the MBA program. The degrees are received simultaneously and conferred separately by the two departments. Students must apply separately to the Mechanical Engineering MS program and the MBA program, meeting the requirements of each department and mentioning their intention to participate in the joint program in each statement of intent.

The program generally takes about three years to complete; however, some students prefer a four-year program (2 years for each degree) to provide adequate time for the MS thesis research and increase possibilities of research funding. Specific requirements are the same as those listed for the Mechanical Engineering MS degree, with the following guidelines:

- MBA 670, Innovation and Entrepreneurship, is required and will count toward both degrees.
- Of the 30 hours required for the MS, 6 hours are for the thesis, and 24 hours are for approved coursework. 12 hours are taken during Year 1, and the remaining 12 hours are taken during Years 2 and 3.
- A total of 12 credits are allowed to be counted toward both degrees, including MBA 670. Some MS courses MUST be taken concurrently with the MBA program in order to meet university requirements; otherwise, the 12 credits will not count toward both degrees.
- Potential thesis advisors should be identified during the application process.

## MECHANICAL ENGINEERING

- It is recommended that the thesis advisor be selected as early as possible (usually before admission). Most financial assistance is related to the thesis work and is administered by individual professors.
- It is strongly recommended that the thesis be completed and defended before beginning the MBA Core classes. It is difficult to stop the research and start it again later.
- Starting during Winter Semester or Spring/Summer Term allows time to begin the thesis research. To begin Spring or Summer term, students should apply for Fall Semester and work with the Graduate Advisor to move up their enrollment.
- The outline below lists coursework during Fall and Winter; however, it is possible to take classes during Spring or Summer, as offered.

### Year 1

#### *Spring/Summer*

- MS Thesis Research (2 hours)

#### *Fall and Winter*

- MS Thesis Research (2 hours)
- MS Coursework (12 hours)

#### *Spring/Summer*

- MS Thesis Research (2 hours)
- MS Thesis Defense

### Year 2

#### *Fall*

- MBA Core

#### *Winter*

- MBA Core
- MBA Electives
- MBA 670

### Year 3

#### *Fall and Winter*

- MBA Electives
- MS coursework (9 hours)

### ***Mechanical Engineering - MS***

The purpose of the MS program in the Department of Mechanical Engineering is to provide a world-class education to students pursuing a master's degree, in an atmosphere enlightened by the principles of the gospel. Specifically the purpose of this program is to produce graduates who:

- Eagerly pursue lifelong learning through study and faith in professional, religious and personal aspects of life.
- Understand the fundamental concepts of math, science, and engineering, particularly as they apply to thermal and mechanical systems.
- Implement the fundamental principles of engineering through hands-on design and analysis, using modern engineering tools and practices, to solve complex, real-world engineering problems with high standards of personal and professional ethics.
- Demonstrate leadership in a specific sub-discipline of mechanical engineering through the development of new knowledge and practices.
- Confidently present their intellectual efforts in a technical forum of professionals in their area of expertise.
- Express faith in God and a desire to serve Him through lifelong service to family, church, profession and community.
- Credit hours: a minimum of 30 hours, six of which are thesis hours. The remaining 24 hours are coursework, half of which must be offered by ME.
- Program of study: each student must submit a study list of approved courses during the first semester.
- Prospectus: each student must submit a written prospectus during the second semester.

- Biannual Evaluations: each student's progress will be evaluated twice a year, in January and May. Satisfactory progress must be maintained in order to remain in the program.
- Residency: work toward the MS must be completed under the direction of a graduate faculty advisor while the student is in residence at BYU for at least two consecutive semesters of 6 or more hours of registration. In residence? is defined as living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty.
- Graduate Seminar: all MS students are required to attend 8 graduate seminars each semester, for two semesters. The seminars include technical presentations by graduate students, faculty members, and invited guests.
- Thesis: a written thesis describing original research must be completed and approved. A maximum of six thesis credits (Me En 699R) may count toward the MS. All work toward the thesis must be open for public review and publication. Exceptions must have written approval from the department and college in advance of any work performed.
- Defense: MS students are required to pass an oral examination of their thesis research.
- Timelimit: the MS student has one year minimum and five years maximum to complete the MS degree.
- GPA: MS students must have a cumulative 3.0 GPA or above in all courses counted toward the master's degree.
- A 39 credit hour coursework only option is available under certain circumstances. Approval must be obtained prior to applying for admission. Departmental financial assistance is generally not available for the coursework option.

Please see the MS Handbook at: <http://me.byu.edu/content/graduate-program-handbooks> for more details regarding requirements.

### **Mechanical Engineering - PhD**

The purpose of the PhD program in the Department of Mechanical Engineering is to provide a world-class education to doctoral students, in an atmosphere enlightened by the principles of the gospel. Specifically the purpose of this program is to produce graduates who:

- Eagerly pursue lifelong learning through study and faith in professional, religious and personal aspects of life.
- Understand the fundamental concepts of math, science, and engineering, particularly as they apply to thermal and mechanical systems.
- Implement the fundamental principles of engineering through hands-on design and analysis, using modern engineering tools and practices, to solve complex, real-world engineering problems with high standards of personal and professional ethics.
- Demonstrate leadership in a specific sub-discipline of mechanical engineering through the development of new knowledge and practices.
- Confidently present their intellectual efforts in a technical forum of professionals in their area of expertise.
- Express faith in God and a desire to serve Him through lifelong service to family, church, profession and community.

Credit hours: *For students with an approved MS:* a minimum of 36 credit hours beyond the MS, which includes 18 hours of dissertation credit and 18 hours of graduate-level coursework, of which a minimum of 9 credit hours must be in mechanical engineering and none of which can be project credit. *For students entering directly from the BS:* a minimum of 54 credit hours beyond

the baccalaureate degree, which may include up to 18 hours of dissertation credit and 36 hours of graduate-level coursework, of which a minimum of 18 credit hours must be in mechanical engineering and none of which can be project credit.

- Program of Study: a study list must be submitted during the second semester of doctoral study. All coursework will be approved on the basis of how to best fulfill research needs, career goals, and integrity of the mechanical engineering program.
- PhD qualifying examination. For students with an MS, the examination must be taken no later than the second offering of the exam during the PhD program. For students entering directly from the BS, the examination must be taken no later than the third offering of the exam during the PhD program. Exams are administered in March and September of each year. The written examination may be retaken only once.
- Prospectus: a written prospectus should be defended and submitted and defended no later than the first anniversary of passing the qualifying examination. The prospectus must be approved at least one year prior to the dissertation oral examination.
- Biannual Evaluations: each student's progress will be evaluated twice a year, in January and May. Satisfactory progress must be maintained in order to remain in the program.
- Residency: work toward the PhD must be completed under the direction of a graduate faculty advisor while the student is in residence at BYU for at least two consecutive semesters of 6 or more hours of registration. In residence? is defined as living and conducting research in the general vicinity of the university, where the student has ready access to research facilities and consultation with the faculty.
- Graduate Seminar: all doctoral students are required to attend 8 graduate seminars each semester, for two semesters. The seminars include technical presentations by graduate students, faculty members, and invited guests.
- Dissertation: A written dissertation describing significant original research must be completed and approved. A maximum of 18 hours of dissertation credits (Me En 799R) may count toward the PhD. All work toward the dissertation must be completely open for public review and publication. Exceptions must have written approval from the department and college in advance of any work performed.
- Defense: all PhD students are required to pass an oral examination of their dissertation research.
- Time limit: the PhD student has eight years maximum to complete the degree.
- GPA: PhD students must have a cumulative 3.0 GPA or above in all courses counted toward the PhD degree.

Please see the PhD Handbook at [http://me.byu.edu/degrees/grad\\_guide.php](http://me.byu.edu/degrees/grad_guide.php) for more details regarding requirements.

### **FINANCIAL ASSISTANCE**

Many graduate students work in the ME department as teaching assistants (TA) or as research assistants (RA). Department scholarship money is also available for graduate students. Funding for assistantships and scholarships is administered by individual faculty members.

## COURSE DESCRIPTION

### ME EN

#### 500.(MeEn-CEEn) Design and Materials Applications. (3)

Prerequisite(s): Ce En 321 or Me En 372; Ce En 203; Me En 250; or equivalents.

Materials selection in design; effects of materials properties, structure and geometry on performance; process selection and property modification techniques; basics of material failure mechanism.

#### 501.(MeEn-CEEn) Stress Analysis and Design of Mechanical Structures. (3)

Prerequisite(s): ME EN 372; or CE EN 321

Stress analysis and deflection of structures; general bending and torsion, with computer applications to mechanical and aerospace structure design.

#### 503.(MeEn-CEEn) Plasticity and Fracture. (3)

Prerequisite(s): ME EN 250 & CE EN 203

Tensor algebra; stress and deformation tensors; relationships between dislocation slip, yielding, plastic constitutive behavior, and microstructure development; cracks and linear elastic fracture mechanics.

#### 504.(Me En-CE En) Computer Structural Analysis and Optimization. (3)

Prerequisite(s): ME EN 372 & MATH 302; or ME EN 372 & MATH 313; or CE EN 321 & MATH 313

Matrix stiffness method for 1D, 2D, and 3D skeletal structure classes. Implementing the matrix stiffness method as a computer program. Nonlinear second-order structural analysis. Structural optimization techniques including stress-ratio method, gradient-based methods, and genetic algorithms.

#### 505.Applied Engineering Math. (3)

Prerequisite(s): MATH 303; or MATH 334; or equivalent.

Advanced engineering mathematics that builds a foundation for graduate mechanical engineering courses and research. Topics include tensor analysis, vector calculus, and solution methods for partial differential equations.

#### 507.(Me En-CE En) Linear Finite Element Methods. (3)

Prerequisite(s): ME EN 372; or CE EN 321

Linear static finite element analysis of elastic solids; problem formulation, finite element discretization, and equation solving; stability, interpolation theory, and error estimates. Introduction to underlying continuum mechanics principles. Isogeometric analysis as a generalization of classical finite element analysis; basic principles of analysis-suitable computational geometry.

#### 510.Compressible Fluid Flow. (3)

Prerequisite(s): ME EN 312; Me En 312 or equivalent.

One-dimensional analysis of compressible flow with area change, friction, heat transfer, shock waves, and combined effects, including experimental methods.

#### 512.Intermediate Fluid Dynamics. (3)

Prerequisite(s): ME EN 312; or instructor's consent, Me En 505 previous or concurrent enrollment.

Fluid transport properties, review of integral analysis, Navier-Stokes equations, exact and similarity solutions, boundary layers, vorticity, jets and wakes.

#### 521.Intermediate Thermodynamics. (3)

Prerequisite(s): ME EN 321

Review of first and second law analysis; exergy; equations of state and other thermodynamic relations; properties of mixtures and multiphase systems; chemical reactions and equilibrium.

#### 522.Combustion. (3)

Prerequisite(s): CHEM 105 & ME EN 340 & ME EN 422; or CH EN 373 & CH EN 376

Introduction to first- and second-law ideal gas combustion systems along with elementary models of homogeneous and heterogeneous premixed and/or diffusion flames.

#### 523.(Me En-CE En) Aircraft Structures. (3)

Prerequisite(s): CE EN 304 & CE EN 321; or ME EN 250 & ME EN 372

Requirements, objectives, loads, materials, and tools for design of airframe structures; static behavior of thin-wall structures; durability and damage tolerance; certification and testing. Airframe component team design project.

#### 534.Dynamics of Mechanical Systems. (3)

Prerequisite(s): ME EN 335

Hamiltonian and Lagrangian dynamics, generalized coordinates, linear and angular momentum, Euler angles, rigid-body motions, and gyroscopic effects. Theory taught with applications integrated.

#### 535.Mechanical Vibrations. (3)

Prerequisite(s): ME EN 335; or equivalent.

Introduction to energy methods for system modeling, eigenvalues and mode shapes, frequency response, and spectral characterization of vibrations.



**537.Advanced Mechanisms, Robotics. (3)**

Prerequisite(s): ME EN 437; or equivalent.

Kinematics and dynamics of advanced mechanisms, such as robots, with computer simulation of mechanism motion.

**538.Compliant Mechanisms. (3)**

Prerequisite(s): ME EN 372; Me En 475 or concurrent enrollment; or instructor's consent.

Design and analysis of compliant mechanisms and compliant structures. Large-deflection analysis/force displacement relationships; mechanisms synthesis.

**540.Intermediate Heat and Mass Transfer. (3)**

Prerequisite(s): ME EN 340; or equivalent; concurrent enrollment in Me En 505.

Analytical approaches to conduction, convection, and radiation heat transfer. Introduction to mass transfer.

**541.Computational Fluid Dynamics and Heat Transfer. (3)**

Prerequisite(s): ME EN 312 & ME EN 340; or instructor's consent.

Fluid dynamics and heat transfer analysis by numerical methods. Theory and implementation of finite difference and finite volume methods.

**550.(Me En-EC En) Microelectromechanical Systems (MEMS). (3)**

Prerequisite(s): EC EN 450; or ME EN 372; or equivalent.

Design, fabrication, and applications of MEMS. Mechanical properties governing their design and reliability and the processing technologies used to fabricate them.

**552.Neuromechanics of Movement. (3)**

Prerequisite(s): ME EN 335; or instructor's consent.

Biomechanics and neural control of human movement. Dynamics of neuromusculoskeletal system; human-machine interaction; movement disorders and assistive/rehabilitative technology; current research techniques.

**555.Introduction to Biomechanics. (3)**

Prerequisite(s): ME EN 312 & ME EN 372 & MATH 303; or ME EN 312 & ME EN 372 & MATH 334; or equivalent.

Mechanics of biological systems. A continuum mechanics-based approach to the structure, function, mechanical response, and active remodeling of hard and soft tissues of the body.

**558.Metallurgy. (3)**

Prerequisite(s): ME EN 250; or instructor's consent.

Fundamental principles of physical metallurgy and their application to design.

**561.(Me En-Phscs) Fundamentals of Acoustics. (3)**

Prerequisite(s): PHSCS 318; or equivalent; Phscs 461 or concurrent enrollment.

Vibrating systems, elastic media, mechanical energy, and radiation. Sound generation, transmission, reflection, and reception.

**562.(Me En-Phscs 660) Acoustic Systems. (3)**

Prerequisite(s): PHSCS 561; or instructor's consent.

Analyzing and modeling electro-mechano-acoustic systems. Transducers, calibration, and acoustical measurements. Sound sources, arrays, coupling, radiation, and directivity. Duct acoustics and acoustic filters.

**570.(Me En-CE En) Computer-Aided Engineering Software Development. (3)**

Prerequisite(s): ME EN 373; or C programming.

Programming methods for development of engineering software. Data structures, architecture, libraries, and graphical user interfaces, with applications to CAD systems.

**574.Product Development Automation. (3)**

Prerequisite(s): ME EN 476; Me En 475; or equivalents.

Design automation, network modeling of design systems, mass customization, agent-based methods, transnational design systems. Aerospace, automotive, and consumer product applications.

**575.(Me En-CE En) Optimization Techniques in Engineering. (3)**

Prerequisite(s): MATH 302; or MATH 313; C, C++, or similar computer language.

Application of computer optimization techniques to constrained engineering design. Theory and application of unconstrained and constrained nonlinear algorithms. Genetic algorithms. Robust design methods.

**576.Product Design. (3)**

Prerequisite(s): ME EN 475; or instructor's consent.

Emerging design methodology and design strategies for complex systems, including decomposition methods and sensitivity analysis. Advanced CAD/CAE/CAM technologies applied to design.

**578.CAD/Cam Applications. (3)**

Prerequisite(s): ME EN 471 & ME EN 570

Principles and practices involved in parametric surface and solid modeling, associativity, NC tool path generation, etc. Construction of complete CAD models for design, analysis, and manufacture.

## MECHANICAL ENGINEERING

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### **579.Global Product Development.** (3)

Prerequisite(s): ME EN 476; Me En 475 or equivalents; senior or graduate status.

Preparing students to be leaders in globally-influenced product development organizations. Includes visits to U.S. and overseas companies and universities.

### **584.Manufacturing Process Machine Design.** (3)

Prerequisite(s): ME EN 372; or equivalent.

Applying machine design principles to manufacturing process machines and tooling; integrating machine elements; precision machine design. Designing and analyzing the effects of loading, combined stresses, and deflections on machine process capability. Sensors applied to process machines.

### **585.Manufacturing Competitiveness: Quality and Productivity.** (3)

Prerequisite(s): ME EN 282

Production strategies to improve quality, decrease cost, and increase throughput to create market advantage; effective production management systems; applying quality improvement tools to process data; theory of constraints and lean production.

### **595R.Special Topics in Mechanical Engineering.** (0.5-18)

Prerequisite(s): Departmental consent.

### **595R.Topics in Mechanical Design.** (0.5-18)

Prerequisite(s): Departmental consent.

### **602.(Me En-CE En) Composite Structures.** (3)

Prerequisite(s): ME EN 372; or CE EN 304

Design and analysis of advanced composite structures; deflections, buckling, and vibration of thin plates and sandwich plates; design guidelines; design examples; project.

### **604.(Me En-CE En) Continuum and Solid Mechanics.** (3)

Prerequisite(s): ME EN 372; or CE EN 321

Derivation of partial differential equations of continuum mechanics. Closed-form solution of classical problems in elasticity. Theory of beams, plates, and axisymmetric shells with closed-form solutions. Large displacement strain tensors, stress tensors, equilibrium equations, beam theory, and plate theory. Constitutive theory including nonlinear elasticity, viscoelasticity, plasticity, and hyperelasticity.

### **607.(Me En-CE En) Nonlinear Finite Element Methods.** (3)

Prerequisite(s): ME EN 507; or CE EN 507

Nonlinear dynamic finite element analysis of solids. Nonlinear continuum mechanics, finite element formulation, and elementary solution algorithms for nonlinear algebraic problems. focusing on hyperelastic solids. Advanced topics in isogeometric analysis, computational analysis-suitable geometry, and adaptivity. An introduction to dynamics; basic methods of time integration, such as Newmark and "alpha" methods.

### **611.Turbulence.** (3)

Prerequisite(s): ME EN 512

Introduction to turbulence, flow instability and transition, concept of scale, Reynolds averaging, wall-bounded and free shear flows, closure modes, and measurement techniques.

### **612.Environmental Fluid Dynamics.** (3)

Prerequisite(s): Me En 512 or instructor's consent.

Fluid dynamics of the atmosphere and oceans related to free surface, two layer, and continuously stratified flows emphasizing linear and nonlinear free-surface and internal gravity waves.

### **613.Experimental Fluid Mechanics.** (3)

Prerequisite(s): Me En 312 or equivalent.

Experimental methods for analyzing fluid flow and heat transfer. Theory and application of techniques in velocimetry, pressure sensing, thermometry, and flow visualization.

### **633.(Me En-EC En 673) Digital Control Systems.** (3)

Prerequisite(s): Me En 431 or EC En 483 or equivalent.

Design of digital controllers for dynamical systems, analysis using the z-transform, digital filter implementation, application of transform-based classical design methods, and modern state-space techniques.

### **634.(Me En-EC En 674) Flight Dynamics and Control.** (3)

Prerequisite(s): Me En 431 or EC En 483 or equivalent.

Dynamics of flight, stability, and control derivatives, longitudinal and lateral control design; state-space control strategies for aircraft; and unmanned air vehicle applications.

### **642.Radiative Heat Transfer.** (3)

Prerequisite(s): ME EN 540

Advanced engineering analysis of radiant heat exchange between surfaces, in enclosures, and in absorbing, emitting, and scattering media.

**643.Convective Heat Transfer (3)**

Prerequisite(s): ME EN 512; or equivalent.

Advanced engineering analysis of convective heat transfer in internal and external laminar and turbulent flows.

**651.Microstructure and Properties. (3)**

Prerequisite(s): ME EN 506

Representations of inhomogenous material microstructure, crystallography, orientation distribution functions, Fourier representations, bounding theories for defect-insensitive properties, grain boundaries and grain boundary engineering, microstructure sensitive design.

**671.Advanced Strategies for Product Development. (3)**

Prerequisite(s): MeEn 475 or instructor's consent.

Theory of advanced strategies for product development. New concepts developed, tested, and applied to real products.

**673.Advanced Design Tool Development. (3)**

Prerequisite(s): MeEn 570 and instructor's consent.

Development and implementation of advanced tools and methods for mechanical design.

**684.Production System Design. (3)**

Prerequisite(s): MeEn 671 or instructor's consent.

Designing manufacturing systems for competitive advantage. Factory layout, simulation and design, and tooling design. Integration of manufacturing design into product development process.

**695R.Special Problems for Master's Students (1-3)**

Prerequisite(s): Department chair's consent.

**699R.Master's Thesis. (1-9)**

**795R.Selected Topics in Mechanical Engineering. (1-3)**

**799R.Doctoral Dissertation. (1-18)**

**FACULTY**

**Blotter, Jonathan D.** *Professor*, PhD, Virginia Polytechnic Institute and State Univ, 1996. Experimental Mechanics, Vibrations and Acoustics

**Bowden, Anton E.** *Associate Professor*, PhD, University of Utah, 2003. Biomechanics, Continuum Mechanics, Nonlinear FEA, Biomaterials

**Bowman, W. Jerry** *Associate Teaching Professor*, PhD, Air Force Institute of Technology, 1987. Aerodynamics

**Charles, Steven K.** *Assistant Professor*, PhD, Harvard-MIT Division of Health Sciences and Technology, 2008. Biomechanics and Neural Control of Movement

**Colton, Mark B.** *Associate Professor*, PhD, University of Utah, 2006. Haptic Interfaces; Dynamic Systems, Robotics

**Crockett, Julie** *Assistant Professor*, PhD, University of California, San Diego, 2007. Fluid Mechanics, Geophysical Fluid Flow

**Fullwood, David** *Associate Professor*, PhD, University of London, 1992. Composites; Computational Methods for Materials, Material Design, Microscopy

**Gorrell, Steven E.** *Associate Professor*, PhD, Iowa State University, 2001. Experimental and Computational Fluid Dynamics, Turbomachinery

**Homer, Eric R.** *Assistant Professor*, PhD, Massachusetts Institute of Technology, 2010. Computational Materials Science and Engineering; Materials Modeling

**Howell, Larry L.** *Professor*, PhD, Purdue University, 1993. Compliant Mechanisms and Rigid-body Mechanisms

**Iverson, Brian D.** *Assistant Professor*, PhD, Purdue University, 2008. Thermal Radiation Absorption and Chemical Sensing

**Jensen, Brian D.** *Associate Professor*, PhD, University of Michigan, 2004. Microelectromechanical Systems (MEMS), Biological MEMS

**Jensen, C. Gregory** *Professor*, PhD, Purdue University, 1993. Computer-Aided Engineering, Computer-Aided Manufacturing

**Jones, Matthew R.** *Associate Professor*, PhD, University of Illinois, 1993. Heat Transfer, Energy, Inverse Problems

**Killpack, Marc D.** *Assistant Professor*, PhD, Georgia Institute of Technology, 2013. Robotics; Controls, Haptic Sensing

**Magleby, Spencer P.** *Professor*, PhD, University of Wisconsin, Madison, 1988. Engineering Design, Product Development; Compliant Mechanisms

**Mattson, Christopher A.** *Associate Professor*, PhD, Rensselaer Polytechnic Institute, 2003. Multi-Objective Optimization, Product Development; Conceptual Engineering Design

**Maynes, R. Daniel** *Professor*, PhD, University of Utah, 1997. Fluid Mechanics, Transport Phenomena

**McLain, Timothy W.** *Professor*, PhD, Stanford University, 1995. Dynamic Systems, Controls, Autonomous Air Vehicles

**Nelson, Tracy W.** *Professor*, PhD, Ohio State University, 1998. Materials and Joining

## MICROBIOLOGY AND MOLECULAR BIOLOGY

**Ning, S. Andrew** *Assistant Professor*, PhD, Stanford University, 2011. Multidisciplinary Optimization, Aerodynamics, Wind Energy, Aeronautics

**Parkinson, Alan R.** *Professor*, PhD, University of Illinois, 1982. Optimization, Computer-Aided Engineering, Robust Design Methods

**Red, W. Edward** *Professor*, PhD, Arizona State University, 1972. Automation, Advances Computer-Aided Applications

**Salmon, John** *Assistant Professor*, PhD, Georgia Institute of Technology, 2013. Systems Engineering, Design and Optimization, Computer-Aided Engineering

**Sorensen, Carl D.** *Professor*, PhD, Massachusetts Institute of Technology, 1985. Design for Manufacture, Manufacturing Processes, Friction Stir Welding

**Thomson, Scott L.** *Associate Professor*, PhD, Purdue University, 2004. Fluid Mechanics, Quantitative Imaging, Biological Fluid-Structure Interactions

**Tree, Dale R.** *Professor*, PhD, University of Wisconsin, Madison, 1992. Coal and Biomass Combustion, Internal Combustion Engines

**Truscott, Tadd T.** *Assistant Professor*, PhD, Massachusetts Institute of Technology, 2009. Fluid Mechanics, Visualization and Imaging

**Webb, Brent W.** *Professor*, PhD, Purdue University, 1986. Heat Transfer

## MICROBIOLOGY AND MOLECULAR BIOLOGY

**Department Chair:** Robison, Richard A.

**Graduate Coordinator:** Griffiths, Joel

4007 LSB, Provo, UT 84602-5253  
(801) 422-2889  
<http://mmbio.byu.edu>

### THE PROGRAMS OF STUDY

The fields of microbiology and molecular biology are closely intertwined and are at the center of some of the most exciting current advances in the biological sciences. With the sequencing of various host and microbial genomes, and the acceleration of technologies for functional genomics and microbial community evaluation, opportunities for significant advances are open to students in our programs.

Graduate programs in Microbiology and Molecular Biology (MMBIO) emphasize a combination of coursework and laboratory experience with an emphasis on the latter. Students are expected to produce a significant body of original research. Our students regularly collaborate on interdisciplinary projects with faculty and students outside of our department. Supporting courses in microbiology and molecular biology may include appropriate courses from various departments in the colleges of Life Sciences, and Physics and Mathematical Sciences. Completion of MMBIO degree programs in the department qualifies students for further graduate study at other universities; employment in educational, industrial, medical, and research institutions; or postdoctoral opportunities leading to careers as research or academic scientists.

The Department of Microbiology and Molecular Biology offers two degrees: Microbiology and Molecular

Biology-MS, and Microbiology and Molecular Biology-PhD. Typically there are about thirty graduate

students in the department at any time. Approximately one half are PhD students and the rest are M.S. students. Average times in the programs are about two years for an MS degree, about three years beyond a master's for the PhD degree, and about five years for the PhD, going directly from the bachelor's without the master's degree.

### *Microbiology and Molecular Biology - MS*

#### Requirements for Degree

- Credit hours (30 hours): minimum 24 course work hours plus 6 thesis hours (MMBio 699R).
- Required courses: Bio 503, MMBio 661, 663, 691R; at least one MMBio 500 or 600 level course; a statistics course; 6 credits of MMBIO 699R, Thesis. Additional courses as determined by student's advisory committee.
- Recommended courses: either Chem 584 or 586.
- Semiannual progress reviews.
- Presentation of research at an annual retreat.
- Thesis: standard university thesis or a journal publication.
- Final public seminar on thesis research.
- Examination: (A) oral examination on course work and (B) oral examination on thesis. These exams must be scheduled on different days.

### *Microbiology and Molecular Biology - PhD*

#### Requirements for Degree

- Credit hours: candidates without a master's degree: 54 semester hours beyond the baccalaureate, including no more than 18 hours of dissertation credit. Minimum of 36 hours beyond master's degree, including 18 hours of dissertation (MMBio 799R).
- Required courses: Bio 503, MMBio 661, 663, 691R; at least one



MMBio 500 or 600 level course not already required; a statistics course; 18 credits of MMBIO 799R, Dissertation; and one of the following: Bio 640, Chem 468, Chem 489, CS 618, PWS 633, Stat 535, or Stat 641. Additional courses as determined by student's advisory committee.

- Semiannual progress reviews.
- Presentation of research at an annual retreat.
- Qualifying Examination: Student will be required to pass the qualifying exam. This includes (1) written outside grant proposal outside the area of expertise, and (2) oral exam on coursework and grant defense.
- Dissertation: standard university dissertation or a journal publication.
- Public seminar and oral defense of dissertation.

## FINANCIAL ASSISTANCE

Teaching and research assistantships are offered by the department.

## RESOURCES AND OPPORTUNITIES

**Electron Optics Laboratory.** Researchers can accomplish all standard electron optics procedures. The laboratory has transmission and scanning electron microscopes equipped with X-ray microanalysis capabilities, plus accessory equipment for freeze-fracture, freeze-drying, and necessary support facilities, including confocal laser scan microscopy.

**Research Instrumentation Core (RIC) Facility.** The RIC houses specialized equipment for use by researchers at BYU. It is equipped with a flow cytometer analyzer and sorter, imaging systems for gels and blots, high-speed centrifuge, plate readers for fluorescence, luminescence, absorbance and radioactivity detection, fluorescent microscope with

digital imaging capacity, nanodrop spectrophotometer, microarray scanner, and gas chromatography microbial identification system.

**DNA Sequencing Center** provides advanced, efficient, and economical services for DNA sequence and DNA fragment acquisition and analysis. Equipment includes 454 Life Sciences Genome Sequencer, Applied Biosystems 3730xi DNA Analyzer, Applied Biosystems 3100 Genetic Analyzer, Parallax 350, Genetix QPix2XT, and Sequencer Software.

**Proteomics and Biological Mass Spectrometry Facility** offers instrumentation to resolve complex proteomes and to identify and characterize the component proteins. Instrumentation assists in identifying proteins in the femtomole range, noncovalent protein interactions, and post-translational modifications, and determining differences in protein expression. The facility is equipped with an Applied Biosystem QSTAR Pulsar Hybrid QqToF Mass Spectrometer and 2D Gel technologies.

**Cancer Research Center** is an independent organization with members coming from the Colleges of Life Sciences, Engineering and Technology, Health and Human Performance, and Physical and Mathematical Sciences. A primary goal of the Cancer Research Center is to provide a rigorous research training program for students. Our ultimate goal is to find a cure through research and education.

**Other Campus Facilities** include a microscopy lab, greenhouses, gardens, arboretum, small-animal vivarium, and tissue culture rooms.

**Faculty research interests** currently include DNA replication, gene regulation, virology, immunology, cancer biology, pathogenesis, host-microbe interactions, molecular evolution, microbial ecology, and clinical lab science.

## COURSE DESCRIPTION

### MMBIO

#### 510.History of Microbiology and Molecular Biology. (2)

Prerequisite(s): Any one 400-level MMBio course.

Exploring the lives and historical settings of major contributors to the development of the sciences of microbiology and molecular biology emphasizing the importance of their ground-breaking discoveries in both basic and applied science.

#### 513.Philosophy of Biology. (2)

Prerequisite(s): MMBIO 240

Epistemological, metaphysical, and ethical issues in the biological sciences. Philosophical questions concerning the theory of evolution, debate between evolution and creationism, fitness, adaptationism, the units of selection, systematics, sociobiology, and evolutionary ethics.

#### 515.RNA-Mediated Gene Regulation. (2)

Prerequisite(s): MMBIO 240

Current advances in studies on RNA processing, including RNA splicing and editing, riboswitches, ribozymes, and the role of small RNAs in RNA interference and regulation of gene expression.

#### 518.Select Pathogens. (2)

Prerequisite(s): MMBio 221 or equivalent.

Current literature in special pathogens.

#### 523.Current Trends in Pathogenesis. (1)

Trends from current literature on pathogenesis of infectious diseases.

#### 528R.Current Topics in Pathogenesis. (1)

Prerequisite(s): MMBio 151, 221, 261 or equivalent.

Readings from current literature on pathogenesis; student presentations and discussion.

## MICROBIOLOGY AND MOLECULAR BIOLOGY

### 551R.Current Topics in Microbiology and Molecular Biology. (1-3)

Readings from current literature on a specific topic; student presentations and discussion.

### 551R.Gene Expression. (1-3)

Readings from current literature on a specific topic; student presentations and discussion.

### 551R.Immunology. (1-3)

Readings from current literature on a specific topic; student presentations and discussion.

### 551R.Microbial Ecology. (1-3)

Readings from current literature on a specific topic; student presentations and discussion.

### 551R.Microbial Genetics. (1-3)

Readings from current literature on a specific topic; student presentations and discussion.

### 551R.Parasitology. (1-3)

Readings from current literature on a specific topic; student presentations and discussion.

### 551R.Pathogenic Microbiology. (1-3)

Readings from current literature on a specific topic; student presentations and discussion.

### 557.Genes and Cancer. (2)

Prerequisite(s): MMBio 441 or equivalent.

Molecular basis of human cancers, emphasizing oncogenes, tumor suppressor genes, chromosomal instability, hereditary cancers, chemical and physical carcinogens, and viral carcinogenesis.

### 565.Molecular Virology. (2)

Prerequisite(s): MMBio 465 or equivalent.

Molecular mechanisms of virus architecture, attachment and entry pathways, replication strategies, oncogenesis, evolution, and mechanisms of pathogenesis.

### 623.Immunology. (2)

Current topics in immunology.

### 624.Microbial Pathogenesis. (3)

Pathology of viral, parasitic, and bacterial diseases.

### 626.Advanced Microbial Genetics. (2)

The molecular genetic basis of prokaryotic and eukaryotic microbial cellular structures, metabolism, and behavior.

### 651R.Special Topics in Microbiology and Molecular Biology. (1-3)

### 661.Molecular Genetics in Practice. (3)

Fundamental concepts in molecular cell biology emphasizing model organisms and experimental approaches including plasmid-based tools, gene manipulation, protein analysis, microscopy, and genomics.

### 663.Articulating Science. (1)

Identifying open scientific questions. Preparing and describing context, impact, and detailed experimental research plans.

### 691R.Graduate Seminar. (1)

### 695R.Research. (0.5-18)

### 699R.Master's Thesis. (1-9)

### 799R.Doctoral Dissertation. (1-9)

## FACULTY

**Berges, Bradford** *Assistant Professor*, PhD, University of Pennsylvania, 2005. Viral Infections of Humanized Mice

**Breakwell, Donald P.** *Teaching Professor*, PhD, Purdue University, 1992. Microbial Ecology

**Bridgewater, Laura C.** *Associate Professor*, PhD, George Washington University, 1995. Transcriptional Regulation; Developmental Biology

**Burnett, Sandra** *Associate Teaching Professor*, PhD, University of Kentucky, 2000. Veterinary Science; Molecular Immunology; Virology

**Davis, Mary** *Assistant Professor*, PhD, Vanderbilt University, 2013. Human Genetics

**Erickson, David** *Associate Professor*, PhD, University of Calgary, Canada, 2003. Bacterial Pathogenesis

**Evans, R. Paul** *Assistant Professor*, PhD, Medical College of Virginia, 1983. Molecular Biology

**Griffitts, Joel** *Associate Professor*, PhD, University of California, San Diego, 2004. Plant-Bacterial Interactions

**Grose, Julianne** *Assistant Professor*, PhD, University of Utah, 2003. Yeast Carbon Metabolism

**Harker, Alan R.** *Professor*, PhD, University of Utah, 1982. Microbial Physiology

**Johnson, Steven** *Assistant Professor*, PhD, Yale University, 2004. Genetic Engineering, Nucleosome Positioning

**McCleary, William R.** *Associate Professor*, PhD, University of California, Berkeley, 1990. Microbial Physiology; Bacterial Signal Transduction

**Nielsen, Brent L.** *Professor*, PhD, Oregon State University, 1985. Plant Molecular Biology

**O'Neill, Kim** *Professor*, PhD, University of Ulster, Northern Ireland, 1986. Genetics; Oncology

**Poole, Brian** *Assistant Professor*, PhD, Pennsylvania State University, 2004. Cell-Virus Interactions

**Robison, Richard A.** *Professor*, PhD, Brigham Young University, 1988. Molecular Biology; Bacterial Pathogenesis; Immunology

**Weber, K. Scott** *Assistant Professor*, PhD, University of Illinois, 2005. Cell and Structural Biology

**Wilson, Eric** *Associate Professor*, PhD, Montana State University, 2000. Immunology

## MUSIC

**Director:** Saville, Kirt  
**Graduate Coordinator:** Bigelow, Claudine

C-550 HFAC, Provo, UT 84602-6410  
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### THE PROGRAMS OF STUDY

The graduate programs in the School of Music are designed to preserve and develop an art form that is essential to human progress and well-being and to provide advanced instruction in the art and craft of music. The School of Music provides graduate education in composition, music education, musicology, and music performance, and it maintains accreditation for all of its degree programs through the National Association of Schools of Music. Two degrees are offered through the School of Music: Music-MA, Music-MM. A music minor is also offered. The School of Music has an average enrollment of seventy graduate students from various U.S. and international areas. The average time for a student to complete a master's degree in music is two years.

#### Music - MA

The master of arts degree is offered with specializations in Music Education and Musicology. A student whose background exhibits deficiencies in academic areas of music may be required to complete additional prerequisite courses during the MA.

**MA in Music Education.** This program is for those with an undergraduate degree in Music Education who wish to pursue further academic study as a means to develop professionally. The culminating project is the completion of a thesis. Coursework combines the study of philosophical, research-based, and theoretical views of teaching and learning music with pragmatic approaches to improving music instruction. Efforts are made

to plan a program of study based on individual students' needs and interests while maintaining standards of musical and scholarly excellence. Available for full-time or summers-only study.

**MA in Musicology.** This program prepares students to be teachers and scholars who will promote musical understanding and appreciation for the arts. Students are expected to add to the body of historical and analytical publication that has increased understanding of the history, practice, sociology, and aesthetics of the cultural heritage of Western (and to a lesser degree non-Western) music. This effort should also increase awareness of cultural and historical diversity represented in concert programs and recordings.

#### Requirements for Specialization-Music Education.

- Prerequisite: baccalaureate degree in music or equivalent.
- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (Music 699R).
- Required courses: Music 501, 672, 673, 674, 675, 698A, 699R; and one appropriate research course outside of music (as approved by advisor).
- Choral Emphasis: Music 533R;
- Instrumental Emphasis: Music 595.
- Electives: 9 hours from graduate music courses and/or graduate courses outside the music field.
- Thesis.
- Examinations: (A) comprehensive written examination; (B) final oral exam and defense of thesis.

#### Requirements for Specialization-Musicology.

- Prerequisite: baccalaureate degree in music or equivalent.
- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (Music 699R).
- Required courses: Music 500, 699R.

## MUSIC

- Any four courses (12 hours) from 601, 602, 603, 604, 605, 606.
- Any three courses (9 hours) from Music 483, 503, 581, 583, 595, 596, 683.
- Electives: 3 hours in music or other departments.
- Thesis.
- Examinations: (A) department language proficiency examination, normally in French or German; (B) comprehensive written examination; (C) final oral exam and defense of thesis.

### **Music - MM**

The master of music degree is offered with specializations in Composition, Conducting, Music Education, and Performance.

**MM in Composition.** The purpose of this specialization is to produce graduates who are prepared to make a significant contribution to the art form, either as composers or as teachers and scholars in composition and theory, and to provide aesthetic enrichment to both the composer and listener.

**MM in Conducting.** Students develop advanced, personal conducting skills and techniques that are precise and suited to a variety of musical needs; attain confidence, poise, and clarity with the baton; learn effective rehearsal techniques; and become familiar with a variety of instrumental and choral scores representing the repertoire of various music periods and sacred and secular styles. They learn to convey through gesture music's power and gentleness and its directness and subtlety to both the performer and audience and to select and bring to the community the great masterpieces of instrumental and choral literature.

**MM in Music Education.** This program is for those with an undergraduate degree in Music Education who wish to pursue further academic study as a means to develop professionally. The culminating project is the completion

of a professional improvement project. Coursework combines the study of philosophical, research-based, and theoretical views of teaching and learning music with pragmatic approaches to improving music instruction as well as instruction on a primary/secondary instrument, conducting and/or teaching methodologies. Efforts are made to plan a program of study based on individual students' needs and interests while maintaining standards of musical and scholarly excellence. Available for full-time or summers-only study.

**MM in Performance.** The intent of the specialization is to prepare students with outstanding performance potential to be competitive in performance and teaching careers and to be advocates for the arts in their communities. They may help meet the needs for skilled performers of solo and small and large ensemble music, and they will be able to teach privately and help meet the considerable community demand for excellent private studio teachers.

### **Requirements for Specialization-Composition.**

- Prerequisite: baccalaureate degree in music composition or equivalent in previous training.
- Credit hours (32): minimum 26 course work hours plus 5 master's composition hours (Music 687R).
- Required courses: Music 500, 503, 587R (5 hours), 650, 683, 687R (6 hours); 3 hours from 601, 602, 603, 604, 605, 606; 6 hours from 581, 583, 591, 596.
- Electives: 3 hours.
- Recital: strongly recommended.
- (Now required with Music 650) Composition.
- Examinations: (A) final oral examination; (B) defense of composition.

### **Requirements for Specialization-Conducting.**

- Prerequisite: baccalaureate degree in music;
- Credit hours: minimum 32 course work hours including recital (Music 697A,B).
- Required courses: Music 500, 660R (conducting, 4 hours), ensemble (2 hours), 697A,B.
- *Band Emphasis:* Music 510, 532, 595, 606, and 5 hours of electives in addition to the 6 hours of electives listed below.
- *Choral Emphasis:* Music 506, 507, 533R (6 hours), and 4 hours of electives in addition to the 6 hours of electives listed below.
- *Orchestra Emphasis:* Music 508, 509, 532, 595, and 6 hours of electives in addition to the 6 hours of electives listed below.
- Electives: 6 hours in nonperformance music graduate courses (as approved by graduate committee) from one or more of the following areas: music education, music history, or music theory.
- Recital.
- Examinations: (A) jury examination each semester of enrollment in 660R; (B) repertory examination; (C) final oral examination.

### **Requirements for Specialization-Music Education.**

- Prerequisite: public school music teacher certification; baccalaureate degree in music.
- Credit hours: minimum 32 course work hours including a professional improvement project (Music 698A,B).
- Required courses: Music 501, 560R (4 hours), 673, 674, 675; 698A,B.
- *Choral Emphasis:* Music 533R (6 hours), and 10 hours of electives.
- *Instrumental Emphasis:* Music 595; 6 hours from 508, 509, 510, 532R, 534R, 535R; and 8 hours of electives.



- Professional Improvement Project.
- Examinations: (A) comprehensive written examination; (B) final oral examination and defense of project.

#### Requirements for Specialization-Performance.

- Prerequisite: baccalaureate degree in performance or equivalent; proficiency in German, French, and Italian diction for voice candidates.
- Credit hours: minimum 32 course work hours including recital (Music 697A,B).
- Required courses:
  - *Voice Emphasis*: Music 500, 505A,B, ensemble (2 hours), 660R (6 hours), 665, 670R (2 hours), 697A,B, and 4 hours of electives in addition to the 6 hours of electives listed below.
  - *Orchestral Instrument Emphasis*: Music 500, 505A,B, large ensemble (2 hours), chamber ensemble (2 hours), 660R (6 hours), 665, 670R (2 hours), 697A,B, and 2 hours of electives in addition to the 6 hours of electives listed below. Scholarship students may have additional ensemble requirements; see your graduate adviser for details.
  - *Keyboard Instrument Emphasis*: Music 500, 505A,B, ensemble (2 hours), 591, 660R (6 hours), 665, 670R (2 hours), 697A,B, and 2 hours of electives in addition to the 6 hours of electives listed below. The ensemble requirement listed above includes 644R.
- Electives: 6 hours in nonperformance music graduate courses (as approved by graduate committee) from one or more of the following areas: music education, music history, or music theory.
- Recital.
- Examinations: (A) jury examination each semester of enrollment in 660R; (B) repertory examination; (C) final oral examination.

#### FINANCIAL ASSISTANCE

The School of Music offers four types of graduate awards: assistantships, internships, performance awards, and scholarships.

#### RESOURCES AND OPPORTUNITIES

The Harris Fine Arts Center, which houses the School of Music, contains two concert halls and numerous practice rooms for music, dance, and theatre.

Graduate students have opportunities to perform individually and with groups in both the Madsen Recital Hall and the de Jong Concert Hall in the Harris Fine Arts Center.

*For a more detailed description of the graduate program requirements, see the online School of Music Graduate Handbook on the School of Music's website.*

#### COURSE DESCRIPTION

##### MUSIC

##### 500.Musical Research Techniques. (2)

Prerequisite(s): Graduate status.

##### 501.Music Education Research Techniques. (2)

Prerequisite(s): Graduate status.

##### 503.Aesthetics. (3)

Prerequisite(s): Music 306 or equivalent.

Fundamental questions of aesthetic theory from classical antiquity to the present, emphasizing musical aesthetics.

##### 505A.Applied Literature. (2)

Prerequisite(s): Minimum of one enrollment in Music 402-407 or equivalent.

Advanced survey and research of literature.

##### 505B.Advanced Applied Literature. (2)

Prerequisite(s): MUSIC 505A

Intensification and deeper study of Music 505A materials.

##### 506.Choral Literature 1. (2)

Prerequisite(s): Instructor's consent.

Concentrated analytical study and application of choral literature through Beethoven.

##### 507.Choral Literature 2. (2)

Prerequisite(s): Instructor's consent.

Concentrated analytical study and application of choral literature from post-Beethoven to the present.

##### 508.Orchestra Literature 1. (2)

Prerequisite(s): Instructor's consent.

Concentrated analytical study and application of orchestral literature of the baroque and classical eras.

##### 509.Orchestra Literature 2. (2)

Prerequisite(s): Instructor's consent.

Concentrated analytical study and application of orchestral literature of the romantic era and the 20th century.

##### 510.Band Literature. (2)

Prerequisite(s): Instructor's consent.

Concentrated study of band literature through analysis and conducting.

##### 511.Oratorio Literature for Solo Voice. (2)

Prerequisite(s): Music 402A or equivalent.

History, repertoire, and performance practice of sacred works with a focus on works from the Baroque Era to Contemporary.

##### 532R.Score Preparation and Conducting: Instrumental. (2)

Prerequisite(s): Instructor's consent.

## MUSIC

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### **533R.Choral Conducting and Development. (2)**

Principles and practices of score preparation, conducting, and choral development as elements of choral artistry.

### **534R.Score Preparation and Direction: Jazz. (2)**

### **535R.Instrumental Conducting and Error Detection. (2)**

Development of critical rehearsal and conducting skills through score preparation, lesson planning, rehearsal goals and predicting issues, performance accuracy, score transpositions, error detection, conducting gesture analysis, and music-mapping for the development of expressive conducting gesture.

### **560R.Performance Instruction. (1-2)**

Prerequisite(s): Graduate music student status.

Performance instruction for students not specializing in performance, and for performance students wishing to study secondary instruments.

### **575R.Summer Music Workshops and Clinics. (0.5-4)**

### **576.Fundamentals and Techniques of the Marching Band. (2)**

Prerequisite(s): Music 294, 296 (or equivalents); music education major status.

Planning, charting, and scoring for marching bands.

### **581.Twentieth-Century Orchestration. (3)**

Prerequisite(s): Music 481 or equivalent.

New techniques for standard and new instruments; analysis and listening.

### **583.Sixteenth-Century Counterpoint. (3)**

Prerequisite(s): C- or higher in Music 294, 296, or equivalent.

Strict modal counterpoint in sixteenth-century style (Palestrina); includes species, text setting, and motet.

### **587R.Composition. (3)**

### **591.Advanced Topics in Keyboard Harmony. (2)**

Prerequisite(s): Instructor's consent.  
Topics vary.

### **595.Score Analysis. (2)**

Analysis of representative choral and instrumental works from the Renaissance through contemporary styles.

### **596.Schenker Analysis. (3)**

Prerequisite(s): Music 306, 395; or equivalents.

Schenker's system of tonal analysis.

### **599R.Academic Internship. (1-6)**

Prerequisite(s): Instructor's consent.

Internship in creative, performing, producing, or teaching applications of major course work.

### **600R.Topics in Music. (1-3)**

Prerequisite(s): Music 305, 306; or equivalents.

### **601.Music in the Middle Ages. (3)**

Prerequisite(s): Music 305, 306; or equivalents.

### **602.Music in the Renaissance. (3)**

Prerequisite(s): Music 305, 306; or equivalents.

### **603.Music in the Baroque Era. (3)**

Prerequisite(s): Music 305, 306; or equivalents.

### **604.Music in the Classic Period. (3)**

Prerequisite(s): Music 305, 306; or equivalents.

### **605.Music in the Romantic Period. (3)**

Prerequisite(s): Music 305, 306; or equivalents.

### **606.Music of the Contemporary Period. (3)**

Prerequisite(s): Music 305, 306; or equivalents.

### **612R.Men's Chorus. (1)**

Prerequisite(s): Audition and director's consent.

Ensemble of male voices that performs a variety of styles and repertoire, ranging from the established literature to popular idioms of the 20th century. Audition required.

### **613R.Women's Chorus. (1)**

Prerequisite(s): Audition and director's consent.

Draws on works from the vast repertoire for treble voices. Audition required.

### **614R.Concert Choir. (1)**

### **615R.University Singers. (1)**

### **616R.Opera Workshop. (1)**

Prerequisite(s): Audition; instructor's consent.

Training and experience in operatic choral music and stage movement.

**617R.Opera Ensemble. (1-3)**  
Prerequisite(s): Audition; instructor's consent.

Training and experience in operatic excerpts, chamber opera, and full productions for operatic soloists.

**625R.Symphonic Band. (1)**

Prerequisite(s): Audition.

Performs standard band literature. Audition required.

**626R.Wind Symphony. (1)**

**630R.Steel Band. (1)**

Prerequisite(s): Director's consent.

Performing Pan music in the Calypso and Soco styles from Trinidad.

**631R.Jazz Combo. (1)**

Prerequisite(s): Audition.

Formed each semester and includes a rhythm section and two or three wind players. These intimate groups provide intensive experience in improvisation and perform frequently. Also participate in the combo master class. Audition required.

**633R.Jazz Ensemble. (1)**

Prerequisite(s): Audition.

High-caliber musical experience with jazz, rock, Latin, and fusion styles and provides opportunities for growth in improvisation. Audition required.

**634R.Synthesis. (1)**

**635R.Jazz Legacy Band. (1)**

Prerequisite(s): Audition.

Traditional ensemble specializing in early jazz. Band occasionally tours off campus.

**636R.Balinese Gamelan. (1)**

Playing and performing on the Balinese gamelan (percussion) instruments.

**637R.Symphony Orchestra. (1)**

Prerequisite(s): Audition.

Performs challenging literature from the standard orchestral repertoire. Collaborative concerts include the annual underclassmen concerto night and the biennial musical. 85-member ensemble performs approximately two times a semester. Audition required.

**638R.Philharmonic Orchestra. (1)**

**639R.Chamber Orchestra. (1)**

**641R.Brass Chamber Music. (1)**

**644R.Keyboard Ensemble. (1)**

**645R.Percussion Ensemble. (1)**

**646R.String Chamber Music. (1)**

**648R.Woodwind Chamber Music.(1)**

**649.Solo Recital. (2)**

Prerequisite(s): Concurrent enrollment in Music 660R.

**650.Graduate Composition Recital. (1)**

Prerequisite(s): MM in Composition student.

Required recital for MM in Composition.

**660R.Graduate Instrument Instruction. (1-2)**

Prerequisite(s): Completion of undergraduate performance proficiency requirements and audition; primary instrument only.

For performance specialization. Fee.

**665.Pedagogy. (2)**

Prerequisite(s): Completion of appropriate undergraduate pedagogy courses or equivalent. Advanced pedagogical studies.

**670.Supervised Teaching. (2)**

Prerequisite(s): Graduate music major status.

Supervised private and group instruction.

**672.Psychology of Music. (2)**

Psychoacoustical properties of musical phenomena and the neurological aspects of music perception and performance.

**673.Historical and Social Foundations of Music Education. (2)**

Leaders, events, and trends in history of music education, emphasizing sociological implications.

**674.Philosophical and Aesthetic Foundations of Music Education. (2)**

Questions related to teaching music in the public schools.

**675.Theories of Music Learning and Motivation. (2)**

Applications of psychology to teaching and learning music. Research paper required.

**676.Teaching Secondary General Music. (2)**

Theories, methods, and practical applications for providing rich musical experiences for secondary students in non-performance music courses; including musical mapping and effective teaching techniques.

**683.Twentieth-Century Counterpoint. (3)**

Prerequisite(s): MUSIC 583

Counterpoint from the works of Schoenberg, Stravinsky, Crumb, Lutoslawski, and others.

**687R.Composition for Master's Degree (1-6)**

Prerequisite(s): Graduate music faculty's consent, based on evidence of ability in composition manifested in preliminary work.

## MUSIC

**694R.Independent Readings.** (1-3)  
Prerequisite(s): Graduate coordinator's consent.

**697A.Researching the Recital.** (2)  
Preparation of a paper related to music of graduate recital. Alternate topic possible with graduate committee's consent. Supervised by the student's committee chair or other appropriate faculty member.

**697B.Recital.** (2)

**698A.Introduction to Professional Improvement Project.** (2)  
Identifying and delineating a project. Study list constructed and advisor assigned.

**698B.Master's Project - Professional Improvement Project.** (2)  
Presentation of project and written report.

**699R.Master's Thesis.** (1-9)  
Prerequisite(s): Department graduate faculty's consent.

## FACULTY

**Anderson, Richard P.** *Professor, DMA, University of Colorado, 1986. Piano Pedagogy*

**Asplund, Christian T.** *Associate Professor, DMA, University of Washington, 1998. Theory and Composition*

**Babidge, Darrell** *Associate Professor, Professional Degree, Manhattan School of Music, 2001. Vocal Performance*

**Belknap, Monte** *Associate Professor, MM, University of Cincinnati, 1994. Violin Performance*

**Bigelow, A. Claudine** *Associate Professor, DMA, University of Maryland, 2002. String Performance and Pedagogy*

**Broomhead, Paul** *Professor, PhD, University of Washington, 1999. Music Education*

**Brough, Ronald P.** *Professor, DA, University of Northern Colorado, 1997. Percussion Performance and Pedagogy*

**Brown, David C.** *Associate Professor, MM, University of Toledo, 1997. Trumpet Performance and Pedagogy*

**Call, R. Steven** *Professor, PhD, University of Utah, 2000. Tuba/Euphonium Performance and Pedagogy*

**Clayton, April** *Professor, DMA, The Juilliard School of Music, 2001. Flute Performance*

**Cook, R. Donald** *Associate Professor, DMA, University of Kansas, 1987. Organ Performance and Pedagogy*

**Dabczynski, Andrew** *Professor, PhD, University of Michigan, 1994. Music Education; Strings*

**Dunn, Robert E.** *Professor, PhD, Northwestern University, 1994. Music Education*

**Durham, Thomas L.** *Professor, PhD, University of Iowa, 1978. Theory and Composition*

**Giovannetti, GERALYN** *Professor, DMA, University of Michigan, 1990. Oboe and Woodwind Performance and Pedagogy*

**Grimshaw, Jeremy** *Associate Professor, PhD, Eastman School of Music, 2005. Musicology*

**Hall, Rosalind** *Associate Professor, MM, Brigham Young University, 1992. Choral Conducting*

**Hansen, H. Eric** *Associate Professor, MM, Peabody Conservatory of Johns Hopkins University, 1989. Performance*

**Harker, Brian C.** *Professor, PhD, Columbia University, 1997. Musicology*

**Hicks, Michael D.** *Professor, DMA, University of Illinois, 1984. Theory and Composition*

**Hinckley, Jaren S.** *Associate Professor, DM, Florida State University, 2002. Clarinet Performance*

**Holden, Scott L.** *Associate Professor, DMA, Manhattan School of Music, 2002. Piano Performance and Pedagogy*

**Howard, Luke** *Associate Professor, PhD, University of Michigan, 1997. Musicology*

**Johnson, Steven P.** *Professor, PhD, University of California, Los Angeles, 1989. Musicology*

**Jones, Stephen M.** *Professor, DMA, University of Cincinnati, 1989. Theory and Composition*

**Katseanes, Kory** *Professor, MM, University of Utah, 1979. Orchestral Conducting*

**Kimball, Wilford W. (Will)** *Associate Professor, DMA, Arizona State University, 2001. Trombone and Brass Performance and Pedagogy*

**Lindeman, Stephan D.** *Professor, PhD, Rutgers University, 1995. Music Theory*

**Lowe, Laurence M.** *Professor, MM, University of Rochester, 1981. Horn and Brass Performance and Pedagogy*

**Peery-Fox, Irene W.** *Professor, DMA, Peabody Conservatory of Johns Hopkins University, 1987. Piano Performance and Pedagogy*

**Peterson, Donald L.** *Associate Professor, DMA, Arizona State University, 1986. Instrumental Conducting*



**Reich, Diane T.** *Associate Professor*, DM, Indiana University, 2003. Vocal Performance and Pedagogy

**Ricks, Steven L.** *Associate Professor*, PhD, University of Utah, 2001. Theory and Composition

**Saville, Kirt R.** *Professor*, EdD, Utah State University, 1991. Music Education

**Shumway, Jeffrey L.** *Professor*, DM, Indiana University, 1982. Piano Performance and Pedagogy

**Smith, Christian B.** *Professor*, DMA, University of Michigan, 2006. Bassoon Performance Instruction

**Smith, Raymond** *Professor*, DM, Indiana University, 1982. Saxophone and Woodwind Performance and Pedagogy

**Staheli, Ronald J.** *Professor*, DMA, University of Southern California, 1977. Choral Conducting

**Thornock, Neil S.** *Associate Professor*, DM, Indiana University, 2006. Theory and Composition

**Vincent, Lawrence P.** *Professor*, DMA, University of Michigan, 1981. Vocal Performance and Pedagogy

**Woods, Alexander** *Assistant Professor*, MM, Yale University, 2008. Violin Performance

## NEUROSCIENCE (PROGRAM)

**Graduate Coordinator:** Reynolds, Paul R.

4005 LSB, Provo, UT 84602-5245  
(801) 422-3706

### THE PROGRAMS OF STUDY

*For degree programs related to neuroscience, see the Department of Physiology and Developmental Biology.*

Neuroscience is an interdisciplinary degree program involving multiple academic colleges and departments (Physiology and Developmental Biology, Psychology, Chemistry and Biochemistry, Communication Disorders, and Mechanical Engineering). Neuroscience is defined as the study of the development and function of the central nervous system and its connection to influencing/regulating behavior. The study of Neuroscience at the graduate level requires the tools provided by training in calculus, general biology, genetics, physiology, molecular biology, chemistry, physics, psychology, research design, and analysis of molecular mechanisms to biochemical pathways that influence behavior.

The Neuroscience degree requirements and course descriptions for the MS and PhD programs are listed under the Physiology and Developmental Biology Department.

### COURSE DESCRIPTION

#### NEURO

**601.Graduate Neuroscience.** (3)  
Prerequisite(s): Neuro 380, 480, 481; or equivalents.

Student presentation of current primary literature.

**649R.Laboratory Research.** (1-6)  
Prerequisite(s): Instructor's consent.  
Laboratory research for neuroscience graduate students.

**689R.Practicum in Neuroscience Teaching or Research.** (0.5-3)

Curricula, principles, concepts, and experiences in effective neuroscience teaching or methods of effective research and grantsmanship in neuroscience.

**694R.Research Presentation.** (0.5-1)

Oral presentation of graduate research projects (introduction, methods, hypothesis, results, and conclusion).

**696R.Neuroscience Graduate Seminar.** (0.5-1)

Seminar series organized by the Neuroscience Center and the Department of Physiology and Developmental Biology. Speakers are enlisted from both inside and outside the university.

**699R.Master's Thesis.** (1-6)

**799R.Doctoral Dissertation.** (1-18)

### FACULTY

**Bangerter, Neal K. (Electrical and Computer Engineering)**  
*Associate Professor*, PhD, Stanford University, 2004. Magnetic Resonance Imaging

**Bigler, Erin D. (Psychology)**  
*Professor*, PhD, Brigham Young University, 1974. Neuropsychology; Neuroanatomy; Neuroimaging

**Brown, Michael D.** *Associate Teaching Professor*, PhD, Colorado State University, 1999. Regulation of Axon and Dendrite Extension; Pathfinding During Nervous System Development

**Busath, David D. (Physiology and Developmental Biology)**  
*Professor*, MD, University of Utah, 1978. Electrophysiology; Molecular Modeling; Molecular Biophysics

## NEUROSCIENCE (PROGRAM)

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**Charles, Steven K. (Mechanical Engineering)** *Assistant Professor*, PhD, Harvard-MIT Division of Health Sciences and Techno, 2008. Control of Movement; Movement Disorders

**Edwards, Jeffrey G. (Physiology and Developmental Biology)** *Assistant Professor*, PhD, University of Utah, 2003. Learning and Memory; Synaptic Plasticity

**Flom, Ross A. (Psychology)** *Associate Professor*, PhD, University of Minnesota, 1999. Attention and Cognition in Infants

**Gale, Shawn D. (Psychology)** *Associate Professor*, PhD, Brigham Young University, 1994. Neuropsychology, Epilepsy, Traumatic Brain Injury and Memory

**Hedges, Dawson W. (Psychology)** *Professor*, MD, University of Utah, 1988. Psychiatry; Neuroscience; Neuroimaging and Neuroendocrinology

**Higley, Dee (Psychology)** *Professor*, PhD, University of Wisconsin, Madison, 1985. Child Development; Primate Behavior

**Hopkins, Ramona O. (Psychology)** *Professor*, PhD, University of Utah, 1996. Cognitive Neuroscience and Neurobiological Approaches to Cognition; Brain Imaging; Brain Behavior Relationships; Emotion; Health-Related Quality of Life; Cognitive Development; Family Stress Due to Illness

**Judd, Allan M. (Physiology and Developmental Biology)** *Professor*, PhD, West Virginia University, 1982. Physiology; Neuroendocrinology

**Kauwe, John S. K. (Biology)** *Assistant Professor*, PhD, Washington University in St. Louis, 2007. Genetic Architecture of Complex Human Diseases

**Kirwan, Brock (Psychology)** *Assistant Professor*, PhD, Johns Hopkins University, 2006. Cognitive Neuroscience of Memory

**Larson, Michael J. (Psychology)** *Assistant Professor*, PhD, University of Florida, 2008. Mechanisms of Cognitive Dysfunction Following Traumatic Brain Injury

**McPherson, David (Communication Disorders)** *Professor*, PhD, University of Washington, 1972. Audiology; Hearing Science; Electrophysiology

**Porter, Chris L. (Family Life)** *Associate Professor*, PhD, Purdue University West-Lafayette, 1996. Infancy; Toddlerhood

**Porter, James P. (Physiology and Developmental Biology)** *Professor*, PhD, University of California, San Francisco, 1982. Neuroendocrinology; Hypertension

**South, Mickle D. (Psychology)** *Assistant Professor*, PhD, University of Utah, 2005. Autism Spectrum Disorder, Child Clinical Psychology

**Stark, Michael R. (Physiology and Developmental Biology)** *Associate Professor*, PhD, University of California, Irvine, 1998. Developmental Biology

**Steffensen, Scott C. (Psychology)** *Associate Professor*, PhD, University of Utah, 1987. Neurobiology of Addiction

**Sudweeks, Sterling N. (Physiology and Developmental Biology)** *Associate Professor*, PhD, University of Utah, 1997. Pharmacology of the Nervous System; Ion Channels

**Wisco, Jonathan J. (Physiology and Developmental Biology)** *Associate Professor*, PhD, Boston University School of Medicine, 2003. Translational Anatomy of Degenerative Diseases

**Woodbury, Dixon J. (Physiology and Developmental Biology)** *Professor*, PhD, University of California, Irvine, 1986. Molecular Mechanisms of Exocytosis; Neuroscience of Transmitter Release

## NURSING

**Dean:** Ravert, Patty

**Graduate Coordinator:** Williams, Mary

500 SWKT, Provo, UT 84602-5532  
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<http://nursing.byu.edu>

### THE PROGRAMS OF STUDY

The graduate program, administered by the College of Nursing, prepares advanced practice nurses to: (1) Integrates scientific findings from nursing, biopsychosocial fields, genetics, public health, quality improvement, and organizational sciences for continual improvement of patient care across diverse settings; (2) Utilizes organizational and systems leadership to promote high quality and safe patient care; (3) Applies methods, tools, performance measures, and standards related to quality improvement and safety within organizations; (4) Participates as a change agent in translating and integrating scholarship and evidence into practice settings to optimize quality patient outcomes; (5) Utilizes patient-center and communication technologies to integrate, coordinate, deliver and enhance health care; (6) Intervenes at the system level through the policy development process and employing advocacy strategies to influence health and health care; (7) Participates, consults, communicates and collaborates as a member and leader of interprofessional teams to manage and coordinate care; (8) Applies and integrates broad organizational, client-centered, culturally appropriate concepts in planning, delivery, managing, and evaluating evidence-based clinical prevention and population care and services to individuals, families and aggregates/identified populations; (9) Provides competent evidence based advanced-practice nursing care as a family nurse practitioner to diverse individuals, families, and groups and manages health and illness across

the continuum of care and across the lifespan; and (10) Provides care in a compassionate manner that respects, protects, and enhances spiritual integrity, human dignity, cultural diversity, and demonstrates the Healer's art.

The College of Nursing is a member of the Council of Baccalaureate and Higher Degree Programs of the National League for Nursing, the American Association of Colleges of Nursing, and the Western Council on Higher Education in Nursing. The program is accredited by the Commission on Collegiate Nursing Education (CCNE) and is also approved by the Utah State Board of Nursing.

The College of Nursing offers one degree in nursing, the Master of Science/Family Nurse Practitioner degree.

Approximately thirty students are enrolled in the College of Nursing's graduate program. The program can be completed in approximately two to three years, although five years are allowed.

### Nursing - MS

The master of science degree program emphasizes clinical expertise and includes nursing theories and concepts as well as extensive clinical experience. Practice based on the best evidence is an important component of the program, and students are required to write a thesis, develop an innovative clinical project, or complete a scholarly evidence-based paper of a relevant clinical problem.

### Requirements for Degree.

Credit hours:

- 59-62 (depending on culminating writing experience selection): minimum 53-56 course work hours plus 6 thesis (Nurs 699R) or project (Nurs 698R) hours; or a scholarly evidence-based paper (Nurs 623, 631).

Required courses:

- Nurs 555, 600, 601, 603, 605, 606, 607, 608, 609, 619, 621, 622, 624, 625, 626, 628, 630, 632, 635R; 698R or 699R; or 623, 631.
- Electives: determined in consultation with graduate committee.
- Thesis/Project or a scholarly evidence-based paper.
- Examination: oral defense of thesis or project.

### FINANCIAL ASSISTANCE

The College of Nursing actively seeks financial resources to assist students. Governmental funds are available, and RNs can usually find local part-time work. The university also has limited funds available. Students who need financial aid should contact the College of Nursing graduate coordinator. Also you can contact the University Financial Aids Office for financing options. College of Nursing research and teaching assistantships are also available.

**Assistantships.** Students must be registered and able to meet the skill and credit-hour requirements for the available teaching and research assistantships. For more information, students should meet with the college graduate coordinator.

**Scholarships.** Scholarships, awarded on the basis of GPA and need, are available to degree-seeking master's students. Recipients must take at least 2 credit hours per semester to maintain the scholarship. They must also maintain at least a 3.0 GPA. See the college graduate coordinator or the graduate secretary for more information.

### RESOURCES AND OPPORTUNITIES

**Research Center.** The college research center, available to faculty and graduate students, is equipped with computer stations and software supporting statistical quantitative data analyses and qualitative

## NURSING

data management. The center has graphics capability and assists in the preparation of research reports, articles, and presentations.

**Facilities.** A graduate study room is available on the fourth floor of the Spencer W. Kimball Tower. The study room is equipped with computers and a printer. Four fully equipped physical assessment stations are found in the Nursing Learning Center. Clinical agencies in urban and rural Utah are settings for advanced practice nursing. Many of these institutions maintain continual clinical research programs and innovative management strategies appropriate for graduate students. Nurse practitioner clinics and rural practitioner sites also offer a challenging experience in becoming an independent practitioner.

### COURSE DESCRIPTION

#### NURS

##### **555.Pharmacology in Advanced Practice. (2)**

Principles of pharmacology and drug therapy for advanced practice nurses.

##### **590R.Independent Study. (0.5-4)** Prerequisite(s): Instructor's consent. Individualized study.

##### **600.Nursing Science 1: Evidence Based Practice. (2)**

Prerequisite(s): Concurrent enrollment in Nurs 627.

Developing skills and knowledge in selecting and synthesizing the best research evidence to provide quality health care.

##### **601.Nursing Science 2: Translating and Integrating Scholarship and Evidence into Practice. (2)**

Prerequisite(s): NURS 600

Developing skills and knowledge in systematically appraising and translating the best research and evidence to provide quality health care.

##### **603.Applied Pharmacology in Advanced Practice. (1)**

Prerequisite(s): NURS 555

Experience in prescribing and managing drug therapy in patients with a variety of conditions and across the life span.

##### **605.Organizational and Systems Leadership. (2)**

Utilize principles of organizational and systems leadership to promote high quality and safe patient care.

##### **606.Advanced Practice Nursing Theories, Roles, Issues, Ethics, and Interprofessional Collaboration. (3)**

Professional theories, roles, issues, ethics, and the use of interprofessional collaboration for advanced-practice nurses.

##### **607.Informatics and Health Care Technologies. (2)**

Use of patient care and other technologies to deliver, integrate, coordinate, and improve outcomes of care.

##### **608.Health Care Policy and Finance. (2)**

Knowledge and skills influencing health care policy; utilizing fiscal accountability to provide quality cost-effective care.

##### **609.Quality Improvement and Safety. (2)**

Utilize methods, tools, performance measures, culture of safety principles, and standards to ensure quality improvement and safety of patient care.

##### **619.Advanced Pathophysiology and Genetics/Genomics. (3)**

The effects of genetics/genomics, cellular physiology, inflammatory and immune response on disease states.

##### **621.Advanced Health Assessment Across the Life Span. (3)**

Development of physical assessment techniques across the life span.

##### **622.Diagnosis and Management of Adult Common Disorders. (5)**

Prerequisite(s): NURS 619 & NURS 621; Concurrent with 624.

Health promotion and disease prevention; diagnosing and managing common psychosocial and physiological alterations in adult patients.

##### **623.Evidence-Based Writing 1: Selecting and Synthesizing. (2)**

Prerequisite(s): NURS 600 & NURS 601

Mentored experience in selecting and synthesizing evidence.

##### **624.Clinical Practicum 1. (3)**

Prerequisite(s): NURS 625;  
Concurrent with 622.

Clinical experience in health promotion and disease prevention; diagnosing and managing adults with common psychosocial and physiological alterations and pediatric and adolescent patients.

##### **625.Diagnosis and Management of Pediatric and Adolescent Disorders and Family Health. (3)**

Health promotion and disease prevention; diagnosing and managing psychosocial and physiological alterations in pediatric and adolescent patients and family health.

##### **626.Clinical Practicum 2. (2)**

Prerequisite(s): NURS 622 & NURS 624 & NURS 625

Clinical experience in health promotion and disease prevention; diagnosing and managing adults with chronic psychosocial and physiological alterations and geriatric patients.

##### **628.Clinical Practicum 3. (2)**

Prerequisite(s): Nurs 555, 600, 601, 606, 619, 621, 622, 623, 624, 625, 626, 629, 630; concurrent enrollment in Nurs 608, 632.

Clinical experience in health promotion and disease prevention; diagnosing and managing patients with acute psychosocial and physiological alterations.



**629.Advanced Pathophysiology and Diagnostic Reasoning. (2)**

Prerequisite(s): Nurs 555, 600, 601, 606, 619, 621, 622, 623, 624, 625; concurrent enrollment in Nurs 626, 630, 631.

Pathology underlying complex disease states; physiologic basis for therapy and management.

**630.Diagnosis and Management of Chronic Adult and Geriatric Disorders. (5)**

Prerequisite(s): NURS 622 & NURS 624 & NURS 625

Health promotion and disease prevention; diagnosing and managing chronic psychosocial and physiological alterations in adult and geriatric patients.

**631.Evidence-Based Writing 2: Critically Appraising and Disseminating Evidence-Based Findings. (1)**

Prerequisite(s): NURS 623

Mentored experience in critically appraising and disseminating evidence-based findings.

**632.Diagnosis and Management of Acute Disorders Across the Life Span. (4)**

Prerequisite(s): NURS 626 & NURS 630

Health promotion and disease prevention; diagnosing and managing acute psychosocial and physiological alterations across the life span.

**635R.Family Nurse Practitioner Internship. (1-8)**

Internship as a family nurse practitioner.

**698R.Project. (0.5-6)**

Prerequisite(s): Committee's consent. Master's project.

**699R.Master's Thesis. (0.5-6)**

Prerequisite(s): Committee's consent.

**FACULTY**

**Beckstrand, Renea** *Professor*, PhD, University of Utah, 2001. Comprehensive Care of the Adult Client with Acute Health Problems

**Freeborn, Donna** *Assistant Professor*, PhD, Oregon Health and Science University, 2008. Women with Disabilities

**Heise, Barbara** *Associate Professor*, PhD, University of Virginia, 2006. Adult and Gerontological Mental Health; Alcohol and Drug Abuse

**Lassetter, Jane** *Associate Professor*, PhD, Oregon Health and Science University, 2008. Culture and Health

**Luthy, Beth** *Assistant Professor*, DNP, Rush University, 2008. Childhood Immunizations

**Macintosh, Janelle B.** *Assistant Professor*, PhD, University of Utah, 2010. Maternal Identity in Vulnerable Populations

**Merrill, Katreena C.** *Assistant Professor*, PhD, University of Utah, 2011. Quality, Patient Safety and Nursing Leadership in Acute Care Settings

**Ravert, Patty** *Professor*, PhD, University of Utah, 2004. Educational Interventions; Use of Human Simulations

**Rogers, Sandra** *Associate Professor*, PhD, University of California, San Francisco, 1989. Primary Health Care; International Health

**Williams, Mary** *Associate Professor*, PhD, University of Arizona, 1991. Family Response to Heart Transplantation; Qualitative Methodologies; Instrument Development

**NUTRITION, DIETETICS, AND FOOD SCIENCE**

*Chair:* Dunn, Michael L.

*Graduate Coordinator:* Fullmer, Susan

S-227 ESC, Provo, UT 84602-4062

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<http://ndfs.byu.edu/>

**THE PROGRAMS OF STUDY**

Food Science is the multidisciplinary study of food, utilizing biology, chemistry, nutrition, engineering, and other sciences. **Nutritional Science** examines the effects of food consumption on the metabolism, health, and disease resistance in humans. Programs in both disciplines offer rigorous classroom instruction combined with challenging, original research. Small faculty-to-student ratios permit intense, meaningful mentoring by faculty advisors.

The Department of Nutrition, Dietetics, and Food Science offers two graduate degrees: Food Science-MS and Nutritional Science-MS. Usual completion time is two years.

**Food Science - MS**

The MS program in food science prepares students to work at an advanced level in the food industry or to pursue a doctoral degree through in-depth study of the chemistry of food component functionality, the microbiology of product manufacture and preservation, and the physical principles involved in processes. Students become proficient at designing and conducting research and development projects and communicating the results in a manner consistent with the best professionalism in the discipline.

**Requirements for Degree.**

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (NDFS 699R).

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- Required courses: NDFS 652, 654, 656, 691R, 699R; Stat 511.
- Minor (optional): selected with approval of faculty advisor.
- Examinations: (1) oral examination on course work; and (2) defense of thesis.
- Thesis: standard university format or journal publication format.

### **Nutritional Science - MS**

The MS program in nutritional science is designed to prepare graduate for doctoral programs and professional school (medicine, podiatry, physician's assistant, dental). Graduates are also employed in government, industry, community, and not for profit organizations. Graduates who are registered dietitians are prepared to work in hospitals, dietetics management, or community nutrition.

Research opportunities include focus on vitamin or mineral metabolism, muscle energy metabolism, bone metabolism, energy metabolism, nutrition education, management in dietetics, and international or community nutrition.

#### **Requirements for Degree.**

- Credit hours (30): minimum 24 course work hours plus 6 thesis hours (NDFS 699R).
- Prerequisites: NDFS 424, 435; Chem 481
- Required courses: NDFS 601, 602, 691R, 699R; Stat 511
- Minor (optional): selected with approval of faculty advisor.
- Examinations: (1) oral examination on course work; and (2) defense of thesis.
- Thesis: standard university format or journal publication format.

### **FINANCIAL ASSISTANCE**

Graduate students may be supported as department teaching assistants or research assistants. Students may also be supported by external

research funds (grants, contracts) awarded to their advisors. Graduate students are encouraged to apply for scholarships, grants, fellowships, assistantships, and other awards made by the department, college, and university and by external funding agencies.

### **RESOURCES AND OPPORTUNITIES**

**Pilot Plant.** The Pilot Plant is used to conduct research dealing with food products, using pilot-scale equipment.

**Sensory Laboratory.** The sensory laboratory is a modern taste panel facility used to train students in sensory testing. Panelists register impressions of samples on computerized questionnaires in an isolated booth equipped with aroma and lighting control. Computerized analysis rapidly transforms data into easily interpreted results.

**Quality Assurance Laboratory.** The quality assurance laboratory performs quality assurance tests for The Church of Jesus Christ of Latter-day Saints Welfare Services. This research grant provides on-the-job-training, practical experience, and the opportunity to receive compensation for the time spent in learning.

**Nutrition Assessment Laboratory.** The nutrition assessment lab houses a dual energy x-ray absorption scanner (DXA) to measure body composition and bone density, an indirect calorimeter to measure resting metabolic rate, infant and adult anthropometric equipment, several pieces of equipment to perform basic biochemical assays (glucose, hemoglobin, lipid profile, urine analysis), and computer carousels for qualitative research.

**Dietetic Internship.** The Brigham Young University Dietetic Internship is currently granted accreditation by the Accreditation Council for Education in Nutrition and Dietetics The Academy of Nutrition and Dietetics, 120 South Riverside Plaza, Suite 2000, Chicago, IL 60606-6995,

(312) 899-4876. The ten-month dietetic internship (DI) meets the competency statements established by the Academy of Nutrition and Dietetics for entry-level dietitians.

See the department Web site for graduate faculty research interests and ongoing research projects.

**Opportunities.** Depending on the research project, a student might learn to do some of the following methods and instrumentation: chromatography (HPLD, GC-MS, headspace analysis), nitrogen analysis, mitochondria respiration assays, animal husbandry, pancreatic islet isolation, live cell imaging, histology, immunofluorescence, molecular biology techniques (proteomics, genomics, bioinformatics, data mining, metabolic studies, real-time PCR, and Western blots), DXA, indirect calorimetry, and qualitative research methods.

### **COURSE DESCRIPTION**

#### **NDFS**

##### **520R. Supervised Practice Experience. (1-4)**

Prerequisite(s): Acceptance into dietetic internship.

Supervised practice experience in clinical, management, and community dietetics settings.

##### **521. Clinical Practice in Dietetics. (2)**

Prerequisite(s): Acceptance into dietetic internship.

Supervised practice in clinical dietetics.

##### **522. Food Systems Management Practice in Dietetics. (2)**

Prerequisite(s): Acceptance into dietetic internship.

Supervised practice in foodservice systems management.

**601.Advanced Human Nutrition 1.** (3)

Prerequisite(s): NDFS 435

Nutritional status and scientific basis for dietary recommendations for carbohydrates, lipids, protein, and energy.

**602.Advanced Human Nutrition 2.** (3)

Prerequisite(s): NDFS 435

Nutritional status and scientific basis for dietary recommendations for vitamins, minerals, and water.

**631R.Selected Topics in Food Science and Nutrition.** (1-2)

Prerequisite(s): NDFS 601, 602; or instructor's consent.

**631R.Diabetes.** (0.5-3)

Prerequisite(s): NDFS 601, 602; or instructor's consent.

**631R.International Nutrition.** (0.5-3)

Prerequisite(s): NDFS 601, 602; or instructor's consent.

**631R.Protein.** (0.5-3)

Prerequisite(s): NDFS 601, 602; or instructor's consent.

**632.Diet and Cancer.** (2)

Prerequisite(s): NDFS 601 & NDFS 602

Critical examination of scientific evidence regarding the role of dietary macronutrients, vitamins, minerals, and phytochemicals in the initiation, promotion, and progression of cancer.

**633.Maternal/Child Nutrition and Health.** (2)

Critical examination of current nutrition-related research, legislation, and policy guidelines for the life stages of pregnancy, lactation, infancy and school-aged children, with the preparation of a grant proposal applied to one of these life stages.

**634.Nutrition Education.** (2)

Prerequisite(s): NDFS 601 & NDFS 602

Theories that guide nutrition education; nutrition education programs for various target populations; designing and implementing a nutrition education intervention.

**635.Advanced Topics in Human Obesity.** (2)

Prerequisite(s): NDFS 435

Neuro-endocrine, genetic, physiologic, and psychological determinants of human obesity; evaluation of current treatments and preventative measures with diet, activity, and behavior modification.

**637.Advanced Management in Dietetics.** (2)

Prerequisite(s): NDFS 374, 375, 445, 458; or equivalents.

Theory and application of management principles in dietetics.

**638.Advanced Clinical Nutrition.** (2)

Prerequisite(s): NDFS 300, 356, 466; or equivalents.

Theory, techniques, and practices in medical nutrition therapy.

**652.Carbohydrates and Their Reactions in Foods.** (3)

Prerequisite(s): NDFS 450

Sugars, higher saccharides, starches, pectins, gums, hemicelluloses, celluloses, and their derivatives and their functions and reactions in foods.

**654.Proteins and their Reactions in Foods.** (3)

Prerequisite(s): NDFS 450

Plant and animal proteins and their functions and changes during food processing; food enzyme properties.

**656.Food Lipids and Their Reactions in Foods.** (3)

Prerequisite(s): NDFS 450

Lipids and their reactions in foods with other components of the food system and/or the surrounding environment; lipid-processing techniques.

**691R.Graduate Seminar.** (1-2)

**697R.Research.** (1-3)

**699R.Master's Thesis.** (1-9)

**FACULTY**

**Bellini, Sarah** *Assistant Professor*, PhD, Utah State University, 2012. Nutrition Assessment of Malnutrition

**Brown, Lora Beth** *Professor*, EdD, Brigham Young University, 1982. Nutrition Education; International Nutrition

**Christensen, Merrill J.** *Professor*, PhD, Massachusetts Institute of Technology, 1982. Molecular Mechanisms of Cancer Risk Reduction by Diet

**Dunn, Michael L.** *Associate Professor*, PhD, Cornell University, 1996. Product Development; Food Preservation and Storage; Food Industry Management

**Fullmer, Susan** *Teaching Professor*, PhD, Brigham Young University, 2004. Role of Diet and Exercise on Bone and Energy Metabolism

**Hancock, Chad** *Assistant Professor*, PhD, University of Missouri, Columbia, 2005. Skeletal Muscle Energy Metabolism

**Jefferies, Laura K.** *Assistant Professor*, PhD, Utah State University, 2011. Food Sensory Analysis; Food Engineering

## PHYSICS AND ASTRONOMY

**Johnston, N. Paul** *Professor*, PhD,  
Oregon State University, 1971.  
International Nutrition; Small  
Animal Nutrition

**Kenealey, Jason** *Assistant Professor*,  
PhD, University of Wisconsin-  
Madison, 2011. Cell Signaling;  
Cancer Treatments

**Nyland Kerr, Nora** *Associate  
Professor*, PhD, Kansas State  
University, 1989. Dietetics  
Education; Management in  
Dietetics

**Pike, Oscar** *Professor*, PhD,  
Purdue University, 1986. Food  
Preservation and Storage; Food  
Analysis

**Richards, Rickelle** *Associate Professor*,  
PhD, University of Minnesota, St.  
Paul, 2007. Community Nutrition;  
Childhood Obesity

**Steele, Frost M.** *Associate Professor*,  
PhD, Purdue University, 1990.  
Food Microbiology; Food Safety;  
Food Preservation and Storage

**Tessem, Jeffery S.** *Assistant Professor*,  
PhD, University of Colorado,  
2007. Pancreatic Beta Cell  
Function and Diabetes

**Williams, D. Pauline** *Assistant  
Teaching Professor*, PhD, Utah  
State University, 2011. Nutrition  
Education; Childhood Obesity

## PHYSICS AND ASTRONOMY

**Chair:** Vanfleet, Richard R.  
**Graduate Coordinator:** Hirschmann,  
Eric W.

N-334, Provo, UT 84602-4604  
(801) 422-9299  
[graduatesecretary@physics.byu.edu](mailto:graduatesecretary@physics.byu.edu)  
<http://physics.byu.edu>

### THE PROGRAMS OF STUDY

The Department of Physics and Astronomy offers graduate training in a variety of subjects including acoustics, astronomy, atomic and molecular physics, condensed matter, optics, plasma, and theory. The department provides abundant opportunities and support for its students and expects them to experience the excitement of discovering new knowledge as they contribute to the on-going development of these age-old disciplines.

Three degrees are offered through the Department of Physics and Astronomy: Physics-MS, Physics-PhD, and Physics and Astronomy-PhD.

The average number of MS and PhD students in the department is twenty-two and fourteen, respectively. The expected time to complete a degree is two to three years for the MS and five to six years for the PhD.

### Physics and Astronomy - PhD

The PhD program prepares students for professional careers in astronomy and astrophysics. These careers include faculty positions at universities and colleges and work in research institutions and private and national astronomical observatories.

#### Requirements for Degree.

- Credit hours (54): Students must pass a minimum of 36 hours in approved course work with a B-grade or better in each class and complete 18 hours of dissertation

research in Phscs 699R. The required graduate seminars Phscs 691R and Phscs 696R do not count toward the approved coursework hours. The final GPA must be a 3.0 or above.

- Required courses: Students are required to enroll in Phscs 601 and 602 their first year, in Phscs 691R each semester of residence, in Phscs 696R the first two semesters of residence, and in 3 hours of 795R at or before the beginning of the dissertation.
- Suggested courses: Phscs 529, 611, 612, 627, 628, 727, 728
- Additional hours from 500-, 600-, and 700-level courses, subject to departmental approval, to make a total of at least 36 hours (may include up to 3 hours of Phscs 697R).
- Study list: In the first year of study a student must be accepted as a research student by a member of the department graduate faculty and with their guidance submit a study list which is the list of courses they will take to complete the 54 hour requirement. This list must be approved by the graduate coordinator.
- Qualifying examination: A department-administered written examination to demonstrate a graduate-level understanding of the physical principles on which the graduate courses build must be successfully passed within 22 months of entering the program. A student has three opportunities to pass the exam. These exams are scheduled near the beginning of fall, winter and spring semester, depending upon demand.
- Candidacy examination: After two years each student presents a written and oral report of research accomplished at BYU to an examining committee. A passing grade is given if the committee decides that the student displays sufficient mastery of background



knowledge and research acumen to successfully complete the PhD. Passing the qualifying examination, having a GPA of 3.0 over at least 5 courses on the study list with no grade lower than a B-, and passing the candidacy examination admits the student to PhD candidacy.

- Prospectus: No later than the third year of residency, a student must submit and successfully defend before their advisory committee a prospectus detailing their proposed plan of research.
- Dissertation: A dissertation must be completed and successfully defended in an oral examination before the student's advisory committee.

### **Physics - PhD**

The physics PhD program prepares students for professional careers in physics. These careers include faculty positions at universities and colleges and work in research laboratories and industry.

#### **Requirements for Degree.**

- Credit hours (54): Students must pass a minimum 36 hours in approved course work with a B-grade or better in each class and complete 18 hours of dissertation research in Phscs 699R. The required graduate seminars Phscs 691R and Phscs 696R do not count toward the approved coursework hours. The final GPA must be 3.0 or above.
- Required courses: Students are required to enroll in Phscs 601 and 602 their first year, in Phscs 691R each semester of residence, in Phscs 696R the first two semesters of residence, and in 3 hours of Phscs 795R at or before the beginning of the dissertation.
- Suggested courses vary by discipline -
- Acoustics: Phscs 660, 661, 662, 721
- Atomic, Molecular, and Atomic Physics: Phscs 641, 642, 651, 652, 731
- Condensed Matter Physics: Phscs 581, 641, 642, 651, 652, 781, 782
- Plasma Physics: Phscs 641, 642, 645, 651, 652, 721, 731, 745
- Theoretical and Mathematical Physics: Phscs 641, 642, 651, 652, 721, 731
- Additional hours from 500-, 600-, and 700-level courses, subject to departmental approval, to make a total of at least 36 hours (may include up to 3 hours of Phscs 697R).
- Study list: In the first year of study a student must be accepted as a research student by a member of the department graduate faculty and with their guidance submit a study list which is the list of courses they will take to complete the 54 hour requirement. This list must be approved by the department graduate coordinator.
- Qualifying examination: A department-administered written examination to demonstrate a graduate-level understanding of the physical principles on which the graduate courses build must be successfully passed within 22 months of entering the program. A student has three opportunities to pass the exam. These exams are scheduled near the beginning of fall, winter and spring semester, depending upon demand.
- Candidacy examination: After two years each student presents a written and oral report of research accomplished at BYU to an examining committee. A passing grade is given if the committee decides that the student displays sufficient mastery of background knowledge and research acumen to successfully complete the PhD. Passing the qualifying examination, having a GPA of 3.0 over at least 5 courses on the

study list with no grade lower than a B-, and passing the candidacy examination admits the student to PhD candidacy.

- Prospectus: No later than the third year of residency, a student must submit and successfully defend before their advisory committee a prospectus detailing their proposed plan of research.
- Dissertation: A dissertation must be completed and successfully defended in an oral examination before the student's advisory committee.

### **Physics - MS**

The master of science degree prepares recipients for work and research in industry, government, or teaching. It is commonly earned by those who intend to continue on for the PhD.

#### **Requirements for Degree.**

- Credit hours (30): Students must pass a minimum of 24 hours in approved course work with a C-grade or better in each class and complete 6 hours of thesis research in Phsc 699R. The final GPA must be 3.0 or above.
- Required courses: Students are required to enroll in Phscs 691R each semester of residence and in Phscs 696R the first two semesters of residence.
- Study list: By the beginning of the second semester of study a student must be accepted as a research student by a member of the department graduate faculty and with their guidance submit a study list which is the list of courses they will take to complete the 30 hour requirement. This list must be approved by the graduate coordinator.
- Undergraduate credit: Up to 6 hours of coursework may be from undergraduate courses (300 level or higher) upon approval of the graduate coordinator.

## PHYSICS AND ASTRONOMY

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- **Prospectus:** In the first year of residency a prospectus detailing the proposed thesis research must be submitted and defended before the student's advisory committee.
- **Thesis:** A thesis must be completed, successfully defended in an oral examination before the student's advisory committee.

Students completing this master's degree with a grade of B- or better in 5 non-repeatable courses who pass the qualifying exam and defend their MS thesis at the level of a PhD candidacy exam may smoothly transition into the Physics or Physics and Astronomy PhD program.

### FINANCIAL ASSISTANCE

Qualified graduate students receive financial aid that may take the form of one or more of the following: teaching assistantships, research assistantships, scholarships (including the John Einar Anderson Scholarship and Copley Fellowship), internships, university-sponsored fellowships, or tuition awards. The amount of financial aid given depends on individual merit.

### RESOURCES AND OPPORTUNITIES

Within the department there are currently six recognized research specialties: Acoustics; Astronomy; Atomic, Molecular, and Optical Physics; Condensed Matter Physics; Plasma Physics; Theoretical and Mathematical Physics.

**Acoustics.** The acoustics research program at BYU is cross-disciplinary, involving the treatment of both fundamental and applied problems in acoustics and vibration using analytical, numerical, and experimental means. It focuses primarily on acoustic signal processing, active and passive noise and vibration control, aeroacoustics, architectural acoustics, audio acoustics, nonlinear acoustics,

outdoor sound propagation, and sound-structure interactions. Many resources are readily available for the effective simulation, measurement, and control of physical systems. In addition to strong computational facilities, the program has acoustical laboratories with extensive

state-of-the-art measurement equipment, two anechoic chambers, two reverberation chambers, and a variable acoustics chamber that can be used for experimental studies.

**Astronomy.** Optical photometric and spectroscopic research at BYU is conducted at our own observatories using telescopes ranging from 0.3 to 0.9 m. There is frequent use of Hubble Space Telescope and Spitzer Space Telescope data and data from observatories in Arizona, Canada, Chile, and South Africa as well as from national and international radio observatories. Topics of current research include evolution of variable stars, especially classical and dwarf Cepheids; the extragalactic distance scale; photometric standard systems; interstellar reddening; old and young galactic star clusters; high mass x-ray binaries; pre-main sequence objects; active galactic nuclei; galaxies in or near cosmic voids; brown dwarf atmospheres; transiting planets; interferometric and single dish studies of MASER and molecular emission from star forming regions, late-type OH/IR stars, supernova remnants, AGN, and starburst phenomena; and theoretical studies of black holes and neutron stars.

**Atomic, Molecular, and Optical Physics.** Computational and experimental studies of ultrafast laser high harmonic generation, quantum measurement, atom and ion interferometry, strongly coupled plasmas, atomic spectroscopy, optical properties of materials in the EUV, thin film deposition and characterization, EUV and x-ray optics, neutron detector development, and quantum optics.

### Condensed Matter Physics.

Condensed matter physics studies the macroscopic and microscopic properties of the "condensed" phases of matter: metals, insulators, semiconductors, superconductors, nanostructures, liquids, and so forth. Nationally, this is the largest and most active area of physics research. Our interests at BYU center on the electronic, magnetic, optical, structural, and dynamic properties of nanostructures and solids, using experimental, theoretical, and computational methods. Our current activities include creation of new nanostructured materials and their study by scanning probe microscopy, magnetometry, and electron-based microscopy and spectroscopy; X-ray and neutron-scattering; computational studies of novel alloys and nanostructures; group theoretical methods applied to phase transitions in crystals; motion and structure of defects in crystals; optical and magnetic resonance studies of electrons and spin coherence in semiconductor nanostructures; magnetic memory and reversal processes in ferromagnetic thin films; and dynamics of superparamagnetic nanoparticles.

**Plasma Physics.** Plasma physics research, both experimental and theoretical, centers on nonneutral plasmas. We have both pure-electron and pure-ion plasma experiments. Our pure-ion plasma experiments are currently centered around measuring the half-life of Beryllium-7 in an ionized state. We also have substantial numerical modeling efforts in support of that goal. Our pure-electron plasma studies are aimed at understanding normal modes of oscillation in these plasmas in both the linear and nonlinear regimes.

**Theoretical and Mathematical Physics.** This group studies the foundations, techniques, and applications of relativity, quantum, and information theory. We develop numerical, algebraic, and analytic approaches to understand complex problems. Current projects include mergers of and energetic emissions

from compact objects in general relativity; critical phenomena in nonlinear field theories; coherent behavior in dynamical systems; interaction between radiation and matter; molecular dynamics of defects and impurities in clusters and solids; spin systems and quantum entanglement. Our computational resources include extensive supercomputing facilities on campus and allocations at national supercomputing centers.

## COURSE DESCRIPTION

### PHSCS

#### 500.(Phscs-Chem-C S-Geol-Math-MthEd-Stat) Business Career Essentials in Science and Math. (1.5)

Introduction for science, math, and statistics majors to careers in industry. Project planning, oral and written business presentations, business accounting, and technology readiness.

#### 513R.Special Topics in Contemporary Physics. (0.5-3)

Prerequisite(s): Instructor's consent.

Topics generally related to recent developments in physics.

#### 529.Advanced Observational Astronomy. (3)

Prerequisite(s): PHSCS 427 & PHSCS 428

Advanced techniques of observational astronomy, emphasizing knowledge and skills necessary to carry out observational scientific investigation in astronomy.

#### 540.Electrical Engineering Principles and Practices for Physicists. (2)

Prerequisite(s): Phscs 140, 145, 220; Math 303 or 334; ability to program in Matlab.

Electronic instrumentation theory and methods. Computer aided circuit design and analysis with transforms, logic and computer simulation. Analog, digital, and discrete signal systems. Printed circuit design and system-on-a-chip creation.

#### 545.Introduction to Plasma Physics. (3)

Prerequisite(s): PHSCS 321 & PHSCS 441

Introduction to plasma physics, including single-particle motion and both fluid and kinetic models of plasma behavior.

#### 561.(Phscs-Me En) Fundamentals of Acoustics. (3)

Prerequisite(s): Phscs 318 or equivalent; Phscs 461 or concurrent enrollment.

Vibrating systems, elastic media, mechanical energy, and radiation. Sound generation, transmission, reflection, and reception.

#### 571.Lasers and Atoms. (3)

Prerequisite(s): Phscs 451, 471; or equivalents.

Laser amplification, cavity design, and control and characterization of temporal and spatial modes. Interactions between lasers and atoms.

#### 581.Solid-State Physics. (3)

Prerequisite(s): Phscs 222 or equivalent.

Introduction to the physics of solids. Crystal structure and symmetry, X-ray diffraction, lattice vibrations, metals and semiconductors, superconductivity, thermal properties, magnetic properties, and dielectric and optical properties.

#### 585.Thin-Film Physics. (3)

Prerequisite(s): Phscs 222 or equivalent.

Preparation, characterization, use, and special properties of modern thin films; interdisciplinary treatment. Of interest to students in applied physics and engineering.

#### 586.Transmission Electron Microscopy for Physical Science and Engineering. (3)

Practical and theoretical aspects of sample preparation, basic and advanced imaging, electron diffraction, and other analytical materials characterization techniques on the transmission electron microscope (TEM).

#### 587.Physics of Semiconductor Devices. (3)

Prerequisite(s): PHSCS 281; or PHSCS 581; or EC EN 450

Device physics, with an in-depth study of the MOS transistor and other nanoscale computing devices.

#### 588.Scanning Electron Microscopy (SEM) for Physical Science and Engineering. (3)

Theoretical aspects of sample preparation, basic and advanced imaging, X-ray energy dispersive spectrometry, and other analytical materials characterization techniques on the scanning electron microscope (SEM).

#### 599R.Academic Internship. (0.5-9)

Prerequisite(s): Department internship coordinator's consent.

Cooperative education internships off campus.

#### 601.Mathematical Physics. (3)

Prerequisite(s): Phscs 318, Math 334; or equivalents.

Topics in modern theoretical physics, including applications of matrix and tensor analysis and linear differential and integral operators.

#### 602.Mathematical Physics. (3)

Prerequisite(s): Phscs 318, Math 334; or equivalents.

Topics in modern theoretical physics, including applications of matrix and tensor analysis and linear differential and integral operators.

## PHYSICS AND ASTRONOMY

### 611.Stellar Astrophysics 1. (3)

Prerequisite(s): Instructor's consent.

Theory of stellar atmospheres and the internal structure of stars.

### 612.Stellar Astrophysics 2. (3)

Prerequisite(s): Instructor's consent.

Theory of stellar atmospheres and the internal structure of stars.

### 618.Advanced Topics in Theoretical Physics. (3)

Introductory group theory. Basic representation theory and developments, with applications to quantum mechanics and molecular and solid-state physics.

### 625.Theory of Relativity. (3)

Prerequisite(s): Phscs 451 or equivalent.

Review of special relativity and general relativity, with applications to modern astrophysics.

### 626.Relativistic Astrophysics. (3)

Prerequisite(s): PHSCS 625

Applications of general relativity to modern astrophysics, including gravitational collapse, black holes, cosmological models, gravitational waves, etc.

### 627.Galactic Astrophysics 1. (3)

Prerequisite(s): Instructor's consent.

Astrophysics of the interstellar medium and galactic structure.

### 628.Galactic Astrophysics 2. (3)

Prerequisite(s): Instructor's consent.

Astrophysics of the interstellar medium and galactic structure.

### 641.Mathematical Theory of Electricity and Magnetism. (3)

Prerequisite(s): Phscs 442 or equivalent.

Advanced electrostatics and magnetostatics, Maxwell's equations and electromagnetic waves, relativistic electrodynamics, radiation theory, and interaction of matter with electromagnetic fields.

### 642.Mathematical Theory of Electricity and Magnetism. (3)

Prerequisite(s): PHSCS 641

Advanced electrostatics and magnetostatics, Maxwell's equations and electromagnetic waves, relativistic electrodynamics, radiation theory, and interaction of matter with electromagnetic fields.

### 645.Magnetohydrodynamic Theory of Plasmas. (3)

Prerequisite(s): PHSCS 545

Plasma equilibrium and dynamics using magnetohydrodynamic theory with application to fusion and astrophysical plasmas.

### 651.Quantum Mechanics. (3)

Prerequisite(s): Phscs 451 or equivalent.

Nonrelativistic quantum mechanics, with applications.

### 652.Quantum Mechanics. (3)

Prerequisite(s): PHSCS 602; Phscs 451 or equivalent.

Nonrelativistic quantum mechanics, with applications.

### 660.(Phscs-Me En 562) Acoustic Systems. (3)

Prerequisite(s): Phscs 561 or instructor's consent.

Analyzing and modeling electro-mechano-acoustic systems. Transducers, calibration, and acoustical measurements. Sound sources, arrays, coupling, radiation, and directivity. Duct acoustics and acoustic filters.

### 661.Advanced Fluid Acoustics. (3)

Prerequisite(s): Phscs 561 or instructor's consent.

General solutions of the wave equation with applications. Kirchhoff-Helmholtz integral theorem. Sound radiation from generalized sources. Attenuation of propagating waves. Acoustic reflection, absorption, and scattering. Enclosed sound fields. Room acoustics. Energy-based acoustics.

### 662.Interactions of Sound Fields and Vibrating Structures. (3)

Prerequisite(s): Phscs 561 or instructor's consent.

Sound-structure interactions. Sound transmission through panels and sound-isolation techniques. Advanced passive and active techniques in sound and vibration control. Near-field acoustic holography.

### 670.Quantum Optics. (3)

Prerequisite(s): Phscs 452, 471; or equivalents.

Quantum description of light and interactions with matter. Nonlinear optics.

### 671.X-Ray Physics. (3)

Prerequisite(s): PHSCS 581 & PHSCS 602; Phscs 452 or equivalent.

Physical characteristics of X-ray generation, optics, and experimental applications. Methods of X-ray imaging emphasized.

### 691R.Colloquium. (0.5)

### 696R.Introduction to Research. (0.5)

One or two research areas to be selected, with 20 hours of participation required each semester.

### 697R.Research. (0.5-6)

### 699R.Graduate Thesis/Dissertation. (1-9)

### 711R.Advanced Topics in Physics. (0.5-3)

Prerequisite(s): Instructor's consent.

Recent and upcoming topics include chaos, thin films, phase transformations, amorphous solids, quantum optics, astronomy using nontraditional frequencies, and particle physics.



**721.Dynamics. (3)**

Prerequisite(s): PHSCS 601 & PHSCS 602; Phscs 321 or equivalent.

Advanced treatment of classical mechanics, including Lagrange's and Hamilton's equations, rigid body motion, and canonical transformations.

**727.Extragalactic Astrophysics and Cosmology 1. (3)**

Prerequisite(s): Instructor's consent.

Astrophysics of galaxies, active galactic nuclei, and cosmology.

**728.Extragalactic Astrophysics and Cosmology 2. (3)**

Prerequisite(s): Instructor's consent.

Astrophysics of galaxies, active galactic nuclei, and cosmology.

**731.Statistical Mechanics. (3)**

Prerequisite(s): PHSCS 601 & PHSCS 651

Advanced thermodynamics, classical statistical mechanics, quantum statistics, and transport theory.

**745.Kinetic Theory of Plasmas. (3)**

Prerequisite(s): PHSCS 545 & PHSCS 642 & PHSCS 721

Plasma equilibrium and dynamics using a kinetic description, including collisionless damping and collisional transport.

**751.Advanced Quantum Theory. (3)**

Prerequisite(s): PHSCS 652

Topics in relativistic quantum mechanics, including quantum field theory.

**752.Advanced Quantum Theory. (3)**

Prerequisite(s): PHSCS 652

Topics in relativistic quantum mechanics, including quantum field theory.

**781.Modern Theory of Solids. (3)**

Prerequisite(s): PHSCS 581 & PHSCS 651

Quantum theory of solids, emphasizing the unifying principles of symmetry, energy-band theory, dynamics of electrons and of periodic lattices, and cooperative phenomena.

**782.Modern Theory of Solids. (3)**

Prerequisite(s): PHSCS 581 & PHSCS 651

Quantum theory of solids, emphasizing the unifying principles of symmetry, energy-band theory, dynamics of electrons and of periodic lattices, and cooperative phenomena.

**795R.Readings in the Research Literature. (1-3)**

Prerequisite(s): Departmental approval.

Focused readings and student presentations based on these readings.

**FACULTY**

**Allred, David D.** *Professor*, PhD,

Princeton University, 1977.

Surfaces, Multilayers, and Nanoscale Thin Films; EUV and Soft X-Ray Optics

**Bergeson, Scott D.** *Professor*, PhD,

University of Wisconsin, 1995.

Experimental Atomic Physics

**Berrondo, Manuel** *Professor*, PhD,

University of Uppsala, Sweden,

1969. Theoretical Physics

**Campbell, Branton J.** *Associate*

*Professor*, PhD, University of

California, Santa Barbara, 1999.

Experimental Condensed Matter Physics

**Chesnel, Karine** *Assistant Professor*,

PhD, Joseph Fourier University,

France, 2002. Experimental

Condensed Matter Physics

**Colton, John** *Associate Professor*, PhD,

University of California, 2000.

Experimental Condensed Matter Physics

**Davis, Robert C.** *Professor*, PhD,

University of Utah, 1996.

Experimental Condensed Matter Physics

**Durfee, Dallin S.** *Associate Professor*,

PhD, Massachusetts Institute of

Technology, 1999. Experimental Atomic Physics

**Gee, Kent** *Associate Professor*, PhD,

Pennsylvania State University,

2005. Acoustics

**Hart, Grant W.** *Associate Professor*,

PhD, University of Maryland,

1983. Plasma Physics

**Hart, Gus L. W.** *Professor*, PhD,

University of California, Davis,

1999. Computational Condensed Matter Physics

**Hess, Bret C.** *Associate Professor*,

PhD, Iowa State University, 1988.

Condensed Matter Physics

**Hintz, Eric G.** *Associate Professor*,

PhD, Brigham Young University,

1995. Observational Astrophysics

**Hirschmann, Eric W.** *Associate*

*Professor*, PhD, University of

California, Santa Barbara, 1996.

Theoretical and Computational Physics

**Leishman, Timothy W.** *Associate*

*Professor*, PhD, Pennsylvania State

University, 2000. Acoustics

**Migenes, Victor** *Professor*, PhD,

University of Pennsylvania, 1989.

Radio Astronomy

**Moody, J. Ward** *Professor*, PhD,

University of Michigan, 1986.

Observational Astrophysics

**Neilsen, David W.** *Associate Professor*,

PhD, University of Texas, Austin,

1999. Gravitational Physics

## PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

**Peatross, Justin B.** *Professor*, PhD,  
University of Rochester, 1993.  
High-Intensity Laser Physics

**Peterson, Bryan G.** *Research Associate  
Professor*, PhD, Brigham Young  
University, 1983. Experimental  
Plasma Physics

**Rees, Lawrence B.** *Professor*, PhD,  
University of Maryland, 1983.  
Nuclear Physics

**Sommerfeldt, Scott D.** *Professor*,  
PhD, Pennsylvania State  
University, 1989. Acoustics

**Spencer, Ross L.** *Professor*, PhD,  
University of Wisconsin, 1979.  
Theoretical Plasma Physics

**Stephens, Denise** *Assistant  
Professor*, PhD, New Mexico State  
University, 2001. Observational  
Astrophysics

**Turley, R. Steven** *Professor*, PhD,  
Massachusetts Institute of  
Technology, 1984. Computational  
and Atomic Physics

**Vanfleet, Richard R.** *Professor*,  
PhD, University of Illinois, 1997.  
Electron Microscopy; Materials  
Physics

**Van Huele, Jean-Francois** *Associate  
Professor*, PhD, Brussels Free  
University, Belgium, 1987.  
Theoretical Physics

**Ware, Michael J.** *Associate Professor*,  
PhD, Brigham Young University,  
2001. Quantum Physics

## PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

*Chair:* Woodbury, Dixon J.  
*Graduate Coordinator:* Reynolds,  
Paul R.

4005 LSB, Provo, UT 84602-5245  
(801) 422-3706  
[pdbio@byu.edu](mailto:pdbio@byu.edu)  
<http://pdbio.byu.edu>

### THE PROGRAMS OF STUDY

Physiology is the study of the functions of body systems. Developmental Biology is the study of how specific genes govern differentiation of cells, tissues, and organs with unique structure and functions. Neuroscience is the study of the development and function of the central nervous system and its connection to influencing/regulating behavior.

Graduate programs within the department offer research training and classroom instruction in a wide range of areas pertaining to these disciplines. A biophysics research group is also part of the department. Areas of research include neuroendocrinology and reproduction, endocrine and immune interactions, development of the central nervous system, hereditary connective tissue disorders, mouse and chick models of development, exercise physiology and glucose metabolism, membrane transport and channel structure, synaptic vesicle recycling, and blood pressure control by the autonomic nervous system.

The Department of Physiology and Developmental Biology offers four graduate degrees: Physiology and Developmental Biology-MS, Neuroscience-MS, Physiology and Developmental Biology-PhD, and Neuroscience-PhD.

The department has approximately thirty-five graduate students enrolled each year. Students working toward

a master's degree generally complete all requirements within two years. PhD students generally complete all requirements in four to five years.

### *Physiology and Developmental Biology - PhD*

This PhD degree program is a comprehensive academic endeavor in physiology and developmental biology. Although the research project of each PhD student will focus in an area of either physiology or developmental biology, all students will be expected to have an understanding of key concepts in both disciplines. The research project will include independent inquiry and in-depth application of the scientific method. Publication of the research in peer-reviewed journals is expected but not required.

#### Requirements for Degree

- Credit hours: 54 hours, including 18 hours of dissertation (PDBio 799R).
- Students who have earned a master's degree must complete at least 36 semester hours of additional graduate work at BYU beyond the master's degree.
- Required courses: Bio 503 (1 hour); PDBio 582 and 601 (3 hours each), 694R (2 hours), 696R (2 hours); Stat 511 (3 hours).
- Research credit (PDBio 649R and 799R) may not exceed 27 hours.
- A seminar must be presented each year (PDBio 694R)
- A professional development requirement must be met (PDBio 689R).
- Dissertation: standard university dissertation format or journal publication format.
- Examinations: (A) comprehensive written and oral examination; (B) defense of dissertation.

### ***Physiology and Developmental Biology - MS***

This MS degree program provides students with a sound understanding of current concepts in physiology and/or developmental biology. The thesis research project teaches the fundamentals of scientific inquiry and trains the students in state-of-the-art research techniques. Submission of the thesis to a peer-reviewed journal is encouraged but not required.

#### **Requirements for Degree**

- Credit hours (30): minimum 24 approved course work hours plus 6 thesis hours (PDBio 699R).
- Required courses (11 hours): Bio 503 (1 hour); PDBio 582 or 601 (3 hours), 694R (2 hours), 696R (2 hours); Stat 511 or equivalent (3 hours).
- A Seminar must be presented each year (PDBio 694R)
- Thesis: standard university thesis format or journal publication format.
- Examinations: (A) course work oral examination; (B) oral defense of thesis.

### ***Neuroscience - MS***

A sound understanding of current concepts in neuroscience is the purpose of this MS degree program. The thesis research project teaches the fundamentals of scientific inquiry and trains students in state-of-the-art research techniques. Submission of the thesis to a peer-reviewed journal is encouraged but not required.

#### **Requirements for Degree**

- Credit hours (30): minimum 24 approved course work hours plus 6 thesis hours (Neuro 699R).
- Required courses: Bio 503 (1 hour); Neuro 601 (3 hours), 649R (2 hours), 694R (2 hours), 696R (2 hours); Stat 511 or equivalent (3 hours).

- A seminar must be presented each year (PDBio694R)
- Thesis: standard university thesis format or journal publication format.
- Examinations: (A) course work oral examination; (B) oral defense of thesis.

For a complete list of neuroscience faculty, please click here: <http://graduatestudies.byu.edu/content/neuroscience-program>

### ***Neuroscience - PhD***

Course work and research that emphasize the integration of molecular biology, developmental biology, biophysics, neuroanatomy, neurophysiology, neuroendocrinology, neuroimmunology, cognition, and behavioral neuroscience is offered through this PhD degree program. Students are required to develop a strong background in the principles of neuroscience and develop the intellectual background and technical expertise necessary for successful research projects in their area of specialization. Publication of the research in peer-reviewed journals is expected but not required.

#### **Requirements for Degree**

- Credit hours: 54 hours, including 18 hours of dissertation (Neuro 799R).
- Students who have earned a master's degree must complete at least 36 semester hours of additional graduate work at BYU beyond the master's degree.
- Required courses: Bio 503 (1 hour); Neuro 601 (3 hours), 649R (2 hours), 694R (2 hours), 696R (2 hours); Stat 511 (3 hours). One semester (2 credits) of Neuro 649R must be performed in a laboratory different than the laboratory of the student's graduate committee chair.
- A seminar must be presented each year (PDBio 694R).

- A professional development requirement must be met (PDBio 689R).
- Dissertation: standard university dissertation format or journal publication format.
- Examinations: (A) comprehensive written and oral examination; (B) defense of dissertation.

For a complete list of neuroscience faculty, please click here: <http://graduatestudies.byu.edu/content/neuroscience-program>

### **FINANCIAL ASSISTANCE**

The Department of Physiology and Developmental Biology offers the following financial aid: teaching assistantships, research assistantships, and tuition awards. Specific endowment fund awards are also available.

### **RESOURCES AND OPPORTUNITIES**

Program resources include the laboratories and equipment of department faculty within the Life Science Building and the Eyring Science Center. An electron microscope laboratory, with both transmission and scanning microscopes, is also located on campus. A DNA sequencing center is available in the Widtsoe Building.

### **COURSE DESCRIPTION**

#### ***PDBIO***

#### **550R.Advanced Topics in Physiology and Developmental Biology. (0.5-4)**

Prerequisite(s): Instructor's consent.

Close interaction between small groups of students and instructor on topics in physiology, developmental biology, or biophysics. Topics vary.

## PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY

### 550R.Molecular Dynamics. (0.5-4)

Prerequisite(s): Instructor's consent.

Close interaction between small groups of students and instructor on topics in physiology, developmental biology, or biophysics. Topics vary.

### 561.Physiology of Drug Mechanisms. (3)

Prerequisite(s): PDBIO 362

Overview of physiological and pharmacological mechanisms and principles of human therapeutics as applied to clinically significant pathophysiology.

### 562.Reproductive Physiology. (3)

Prerequisite(s): PDBio 362 or equivalent.

Mammalian reproductive physiology.

### 565.Endocrinology. (3)

Prerequisite(s): PDBio 362 or instructor's consent.

Mammalian hormones.

### 568.Cellular Electrophysiology and Biophysics. (3)

Prerequisite(s): PDBIO 362 & PHSCS 140; or PDBIO 362 & PHSCS 220

Using electrophysiology and biophysics as an approach to study of physiology. Extensive look at ion channels and cell signaling.

### 582.Developmental Genetics. (3)

Prerequisite(s): PDBio 482 or equivalent.

Gene function and regulation during cell specification and differentiation, pattern formation, and organogenesis in developing embryo.

### 601.Cellular and Molecular Physiology. (3)

Prerequisite(s): PDBio 362, 363; or equivalents.

Primary literature used to explore modern concepts of physiology at the cellular and molecular level. Topics include muscle function, transport mechanisms, cell signaling, and ion channels.

### 649R.Laboratory Research. (1-6)

Prerequisite(s): Instructor's consent.

Laboratory research for graduate students.

### 650R.Selected Topics in Physiology, Developmental Biology, and Neuroscience. (1-3)

Prerequisite(s): Instructor's consent.

Topics vary.

### 650R.Renal and Gastrointestinal Physiology. (1-3)

Prerequisite(s): Instructor's consent.

### 650R.Advanced Developmental Biology. (1-3)

Prerequisite(s): Instructor's consent.

### 650R.Molecular Neuroscience. (1-3)

Prerequisite(s): Instructor's consent.

### 650R.Differential Equations in Biology. (1-3)

Prerequisite(s): Instructor's consent.

### 664.Cardiovascular and Respiratory Physiology. (2)

Prerequisite(s): PDBio 362 or equivalent.

Advanced course based on current research literature.

### 689R.Practicum in Life Sciences Teaching or Research. (0.5-3)

Curricula, principles, concepts, and experiences in teaching life sciences effectively or methods of effective research and grantsmanship in the life sciences.

### 694R.Research Presentation. (0.5)

Oral presentation of graduate research project (introduction, methods, hypothesis, results, conclusions).

### 696R.Graduate Seminar. (0.5)

Seminar series organized and run by the Department of Physiology and Developmental Biology. Speakers are enlisted from both inside and outside the university.

### 699R.Master's Thesis. (1-6)

### 799R.Doctoral Dissertation. (1-18)

## FACULTY

#### Alder, Jonathan K. *Assistant*

*Professor*, PhD, Johns Hopkins University, 2007. Telomeres Contribution to Human Health and Disease, Specifically Lung Disease

#### Arroyo, Juan A. *Assistant*

*Professor*, PhD, Southern Illinois University School of Medicine, 2003. Molecular signaling of trophoblast cells apoptosis and the regulation of cell invasion during pregnancies complicated with intrauterine growth restriction, preterm delivery, and preeclampsia

#### Barrow, Jeffery R. *Associate Professor*,

PhD, University of Utah, 1999. Molecular Mechanisms of Development of Limbs and Craniofacial Structures; Tumorigenesis

#### Bell, John D. *Professor*, PhD,

University of California, San Diego, 1987. Pharmacology; Membrane Physiology

#### Bikman, Benjamin T. *Assistant*

*Professor*, PhD, East Carolina University, 2008. Obesity and Metabolism

#### Brown, Michael D. *Associate Teaching*

*Professor*, PhD, Colorado State University, 1999. Regulation of Axon and Dendrite Extension and Pathfinding During Nervous System Development

#### Busath, David D. *Professor*, MD,

University of Utah, 1978. Electrophysiology; Molecular Modeling; Molecular Biophysics



**Charles, Steven K.** *Assistant Professor*, PhD, Harvard-MIT Division of Health Sciences and Technology, 2008. Mechanical and Medical Engineering

**Edwards, Jeffrey G.** *Associate Professor*, PhD, University of Utah, 2003. Synapse Activity and Structure

**Hansen, Marc D.** *Associate Professor*, PhD, Stanford University, 2002. Molecular Basis of Cell-Cell Adhesion in Development and Metastasis

**Hedges, Dawson W.** *Professor*, MD, University of Utah, 1988. Affiliated Neuroscience Faculty; Psychiatry: Neuroscience; Neuroimaging, Effects of Stress on Brain Structure

**Hopkins, Ramona O.** *Professor*, PhD, University of Utah, 1996. Affiliated Neuroscience Faculty; Cognitive Neuroscience Psychology; Learning and Memory; Neurobiological Approaches to Cognition; Neuroimaging; Health Related Quality of Life

**Judd, Allan M.** *Professor*, PhD, West Virginia University, 1981. Physiology; Neuroendocrinology

**Kirwan, Brock** *Assistant Professor*, PhD, Johns Hopkins University, 2006. Cognitive Neuroscience of Memory

**Kooyman, David L.** *Professor*, PhD, Ohio University, 1993. Mechanisms of Gene Expression

**Porter, James P.** *Professor*, PhD, University of California, San Francisco, 1982. Neuroendocrinology; Hypertension

**Reynolds, Paul R.** *Associate Professor*, PhD, University of Cincinnati, Cin. Children, 2004. Developmental Role of Autocrine/Paracrine Signaling in Lung During Branching Morphogenesis

**Silcox, Roy W.** *Associate Professor*, PhD, North Carolina State University, 1986. Reproductive Physiology; Management; Superovulation; Embryonic Development

**South, Mickle** *Assistant Professor*, PhD, University of Utah, 2005. Child Clinical Psychology

**Stark, Michael R.** *Associate Professor*, PhD, University of California, Irvine, 1998. Developmental Biology

**Steffensen, Scott C.** *Associate Professor*, PhD, University of Utah, 1986. Neuropharmacology; Neurobiology of Addiction; Learning and Memory

**Sudweeks, Sterling N.** *Associate Professor*, PhD, University of Utah, 1997. Pharmacology of the Nervous System; Ion Channels

**Suli, Arminda** *Assistant Professor*, PhD, University of Utah, 1999. Neural Circuitry Development

**Thomson, David M.** *Assistant Professor*, PhD, East Carolina University, 2005. Intracellular Signaling Pathways Controlling Skeletal Muscle Growth and Metabolism

**Wisco, Jonathan J.** *Associate Professor*, PhD, Boston University School of Medicine, 2003. Histological Validation of Imaging Biomarkers for Neurodegenerative Diseases and Neurodevelopmental Disorders

**Woodbury, Dixon J.** *Professor*, PhD, University of California, Irvine, 1986. Molecular Mechanisms of Exocytosis; Neuroscience of Transmitter Release; Electrophysiology of Ion Channels

## PLANT AND WILDLIFE SCIENCES

**Chair:** Jellen, Eric

**Graduate Coordinator:** McMillan, Brock R.

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<http://pws.byu.edu/>

## THE PROGRAMS OF STUDY

The Department of Plant and Wildlife Sciences offers graduate training and education in a variety of areas: plant sciences, biotechnology, genetics, environmental science, ecology, soil science, and wildlife and wildlands conservation. Those admitted to this program will have completed BS degrees with strong backgrounds in the basic mathematical, physical, and biological sciences. Students completing requirements in our graduate degree programs will be prepared to accept employment in plant genetics, biotechnology, conservation, ecology, environmental science, wildland and wildlife management, or consulting or to continue graduate education toward a PhD and postgraduate studies.

Four degrees are offered through the Department of Plant and Wildlife Sciences: Environmental Science-MS; Genetics and Biotechnology-MS; Wildlife and Wildlands Conservation-MS; and Wildlife and Wildlands Conservation-PhD.

These graduate programs are supported by faculty members within the department. Their research and teaching interests include wildland ecology, wildlife biology, plant ecology, genetics and biotechnology, plant growth under environmental stress, urban landscape environments, bioremediation of contaminated soils and water, and both modern and ancient agricultural environments. All MS and PhD degrees are earned

in thesis-only programs. Students are expected to present their theses in the form of one or more manuscripts ready for submission to refereed journals.

### ***Wildlife and Wildlands Conservation - MS***

This program emphasizes the scientific method in developing critical thinking and analytical skills applied to conservation and management problems related to wildlife ecology, wildlands, restoration science and/or rangeland ecology. Depending on the emphasis, advanced training in topic specialties may be complemented by courses in statistics, geographical information systems (GIS), soil sciences, model testing, systematics, or advanced ecology. All emphases require original research topics with the results presented in thesis format. This research is expected to be of a publication quality and thesis style best reflecting that of a professional journal, thus facilitating timely submissions for publication. We also encourage formal presentations at professional meetings.

#### **Requirements for Degree**

- Credit hours: (30): minimum 24 course work hours plus 6 thesis hours (PWS 699R).
- Undergraduate hours: no more than 10 semester hours may be applied toward master's degree.
- Required courses: PWS 694R (seminar-two semesters). Additional courses as determined by student's advisory committee and approved by department graduate coordinator.
- Biannual progress reviews by advisory committee and graduate committee.
- Presentation of research prospectus to advisory committee.
- Thesis: completion of the thesis in scientific journal format and prepared for journal submission.
- Examination: final oral defense of thesis.

### ***Wildlife and Wildlands Conservation - PhD***

This program emphasizes the scientific method in developing critical thinking and analytical skills applied to conservation and management problems related to wildlife ecology, wildlands, restoration science and/or rangeland/wildland ecology. Depending on the emphasis, advanced training in topic specialties may be complemented by courses in statistics, geographical information systems (GIS), soil sciences, model testing, systematics, or advanced ecology. All emphases require original research topics with the results presented in dissertation format. This research is expected to be of a publication quality and dissertation style best reflecting that of a professional journal, thus facilitating timely submissions for publication. We also encourage formal presentations at professional meetings.

#### **Requirements for Degree**

- Credit hours: minimum 54 credit hours, including 18 hours of dissertation (PWS 799R).
- Students who have earned a master's degree must complete at least 36 credit hours of additional graduate work at BYU beyond the master's degree.
- Required courses: PWS 694R (seminar-four semesters). Additional courses as determined by student's advisory committee and approved by department graduate coordinator.
- Two consecutive six-hour semesters on BYU campus to fulfill the doctoral residency requirement.
- Biannual progress reviews by advisory committee and graduate committee.
- Presentation of research prospectus to advisory committee.
- Dissertation: completion of the dissertation in scientific journal format and prepared for journal submission.

- Examination: (A) comprehensive oral and written examination; (B) oral defense of dissertation.

### ***Genetics and Biotechnology - MS***

Genetics is the study of inheritance. Biotechnology is the application of modern DNA marker, isolation, and transfer technologies toward improving plant and animal agricultural productivity, environmental remediation, and the treatment of disease. These branches of biology have risen to prominence during the course of the past fifteen years and are widely recognized for their potential impact upon society in the twenty-first century. Employment opportunities in industry and academia are especially plentiful for graduates with advanced degrees in genetics and biotechnology. All emphases require original research topics with the results presented in thesis format. This research is expected to be of a publication quality and thesis style best reflecting that of a professional journal, thus facilitating timely submissions for publication. We also encourage formal presentations at professional meetings.

#### **Requirements for Degree**

- Credit hours: (30): minimum 24 course work hours plus 6 thesis hours (PWS 699R).
- Undergraduate hours: no more than 10 semester hours may be applied toward master's degree.
- Thesis: completion of the thesis in scientific journal format and prepared for journal submission.
- Required courses: PWS 586, 673R and 670, plus two semesters of 694R.
- Biannual progress reviews by advisory committee and graduate committee.
- Examinations: final oral defense of thesis.

- Minor: not required; students who do desire a minor may choose from botany, chemistry, computer science, food science, geology, geography, mathematics, microbiology, physics, statistics, range science, or zoology.

### **Environmental Science - MS**

Pursuit of the MS degree in environmental science provides students with research and education opportunities in environmental protection and remediation and in plant growth and physiology. Students will select graduate course work in soil science, biology, and environmentally related courses taught in departments across the campus. Those completing program requirements will be well prepared for employment in environmental and agricultural consulting, teaching at the junior college level, and continued graduate studies for the PhD. Their research and teaching interests include: plant growth under environmental stress, invasive species, plant physiology, urban landscape environments, bioremediation of contaminated soils and water, and both modern and ancient agricultural environments. All emphases require original research topics with the results presented in thesis format. This research is expected to be of a publication quality and thesis style best reflecting that of a professional journal, thus facilitating timely submissions for publication. We also encourage formal presentations at professional meetings.

#### **Requirements for Degree**

- Credit hours: (30): minimum 24 course work hours plus 6 thesis hours (PWS 699R).
- Undergraduate hours: no more than 10 semester hours may be applied toward master's degree.
- Thesis: completion of the thesis in scientific journal format and prepared for journal submission.
- Required courses: Two semesters of PWS 694R (seminar) and one semester of graduate statistics (Stat 511).
- Biannual progress reviews by advisory committee and graduate committee.
- Examinations: final oral defense of thesis.
- Minor: not required; students who do desire a minor may choose from botany, chemistry, computer science, food science, geology, geography, mathematics, microbiology, physics, statistics, range science, or zoology.

### **FINANCIAL ASSISTANCE**

Teaching and research assistantships are offered on a competitive basis by the department. Tuition assistance is also available for both MS and PhD degrees.

### **RESOURCES AND OPPORTUNITIES**

**Ezra Taft Benson Agriculture and Food Institute.** The major objective of the Institute is to raise the quality of life among the people of the world through improved nutrition and enlightened agricultural practices. Emphasis is placed on teaching and training students who wish to work in foreign countries and on training people from those countries in agriculture and food science practices that can be used to improve life. Research to improve agricultural practices, family nutrition, and appropriate technology is encouraged.

**M. L. Bean Life Science Museum.** Extensive biological collections are housed in the M. L. Bean Life Science Museum and are available for supervised student research. Curators and their students often conduct fieldwork throughout the U.S., and in many other parts of the world.

**Lytle Ranch Preserve.** Graduate students are able to do year-round research on desert plants and animals at the Lytle Ranch. This large preserve is located in the moderate desert climate of southwestern Utah.

**USDA Forest Service Shrub Science Laboratory.** Housed on the BYU campus, this laboratory supports one of the finest research programs on native shrubs in the world. Here eleven PhD research scientists with adjunct faculty appointments work with BYU faculty members and graduate students. Laboratories, greenhouses, and gardens on campus and around the state support studies on desert shrubs.

**Other Laboratory and Field Resources.** On the Provo campus are an arboretum, a small animal vivarium, a tissue culture room, several environmental chambers, and excellent greenhouse facilities. Laboratory facilities include gas chromatographs-mass spectrometers, isotope ratio mass spectrometers, transmission and scanning electron microscopes, ultra centrifuges, visible ultraviolet and infrared spectrophotometers, gas chromatographs, high-performance liquid chromatographs, infrared gas analyzers, atomic absorption spectrophotometer, inductively coupled plasma spectrophotometer, ion chromatograph, near infrared spectrophotometer, genome sequencer FLX instrument, and many other items.

Faculty and graduate students are currently engaged in a number of significant and interesting research projects, funded both internally and externally.

## COURSE DESCRIPTION

### PWS

#### 512.Rangeland Landscape Ecology and Geographic Information Systems. (3)

Applying landscape ecology theory to evaluate, describe, and predict spatial patterns and processes within rangeland ecosystems using geographic information systems (GIS), remote sensing, and global positioning systems (GPS).

#### 513.Environmental Field Instrumentation. (4)

Prerequisite(s): Phscs 105 and PWS 282; or equivalents.

Hands-on course and lab teaching students how to use instrumentation in the field and in controlled settings to measure key environmental parameters. Learning the physical principles underlying sensors.

#### 514.Soil Microbiology. (2)

Prerequisite(s): Chem 105 and 106; or equivalents.

Ecology and role of soil microorganisms in biogeochemical cycles, decomposition of organic matter and waste materials, and bioremediation of contaminated soils and water.

#### 520.Saline and Sodic Soils. (3)

Prerequisite(s): PWS 305, Chem 105, 106, 107; or equivalents.

Physical and chemical properties of saline and sodic soils and irrigation waters--their diagnosis, reclamation, and management for sustainable crop production.

#### 540.Plant Response to the Environment. (3)

Prerequisite(s): PWS 440 or equivalent; PWS 494R or concurrent enrollment.

Advanced plant physiological ecology principles.

#### 547.Ungulate Conservation and Management. (2)

Prerequisite(s): PWS or Bio 350; and Bio 447; or equivalents.

Integrating principles of natural history, population ecology, behavior, and conservation biology of North American ungulates. Special emphasis on management and conservation applications.

#### 551.Quantitative Ecology. (3)

Prerequisite(s): Bio 350 or equivalent; Stat 121 or 511 or concurrent enrollment.

Quantitative methods for ecological sampling and data analysis.

#### 553.Restoration Ecology. (3)

Prerequisite(s): PWS 282, 416; Bio 350; or equivalents.

Nature of ecosystem disturbance and plant succession; developing science and practice of ecological restoration; case studies of applied restoration.

#### 554.Wildlife Behavioral Ecology. (3)

Prerequisite(s): Bio 100, 350; or equivalents.

Integrating principles of ethology, sociobiology, and behavioral ecology using examples from wildlife resources; behavioral sampling methods.

#### 559.Molecular Plant Breeding. (3)

Prerequisite(s): PWS 265, 340, 485, 586, PDBio 360; or equivalents; PWS 494R or concurrent enrollment.

Molecular genetics methods applied to improvement of economically important plants. Theory and methods of plant transformations.

#### 560.Soil and Plant Analysis. (2)

Prerequisite(s): Chem 105, 106, 107; or equivalent.

Laboratory chemical analysis of soils and plant materials in soil and plant research.

#### 575.Plant Pathology. (3)

Prerequisite(s): PWS 100 or equivalent.

Concepts associated with symptoms, development, control, and classification of plant diseases. Identification and classification of plant fungi, bacteria, and viruses.

#### 586.Plant Cell Biology. (3)

Prerequisite(s): PDBio 360, PWS 340, 440; or equivalents.

Molecular aspects of the structural and functional characteristics of plant cells, emphasizing characteristics of plant cells setting them apart from animal cells.

#### 598R.Advanced Topics in the Plant and Wildlife Sciences. (1-3)

#### 629.Conservation of Mega and Meso Carnivores. (3)

Life histories of representative carnivores with political, popular, and managerial problems surrounding their existing and proposed conservation.

#### 633.Biometry and Experimental Design. (3)

Prerequisite(s): Stat 121 or 510 or equivalent.

The design, analysis, and interpretation of biological research using modern analytical tools and relevant software.

#### 634.Analysis and Management of Plant and Animal Populations. (3)

Exposure to common tools for analysis and management of plant and animal populations. Program mark, program distance, movement and home range analysis, point pattern analysis, etc.



**660.Environmental Site Evaluation and Analysis. (2)**

Prerequisite(s): PWS 282 & 283; PWS 405 or 406; or equivalents.

Sampling, analyzing, and interpretation of plant, water, and soil matrixes in native, agricultural, and urban sites. Emphasis on completing Environmental Site Assessments.

**670.Analysis of Complex Genomes. (3)**

Prerequisite(s): PWS 340 or equivalent.

Genetic analysis of quantitative traits in plants and animals.

**673R.Cytogenetics. (3)**

Prerequisite(s): PWS 340, 485; or equivalents.

Chromosome structure and function; classical and molecular cytological methods of chromosome and genome analysis.

**673R.Plant Cytogenetics. (3)**

Prerequisite(s): PWS 340, 485; or equivalents.

**694R.Seminar. (1)****697R.Research. (1-9)****698R.Master's Project. (1-6)****699R.Master's Thesis. (1-9)****799R.Doctoral Dissertation. (1-9)****FACULTY**

**Aanderud, Zachary T.** *Assistant Professor*, PhD, University of California, Davis, 2006. Microbial and Ecosystem Ecology

**Allen, Phil S.** *Professor*, PhD, University of Minnesota, 1990. Seed Biology; Ecological Restoration

**Allphin-Rapier, Loreen** *Associate Professor*, PhD, University of Utah, 1996. Plant Ecology; Plant Reproductive Biology; Conservation Genetics

**Anderson, Val Jo** *Professor*, PhD, Texas A&M University, 1988. Range Ecology; Ecophysiology

**Booth, Gary M.** *Professor*, PhD, University of California, Riverside, 1969. Insect Physiology; Toxicology

**Coleman, Craig E.** *Associate Professor*, PhD, Pennsylvania State University, 1992. Genetics and Biotechnology

**Geary, Bradley D.** *Associate Professor*, PhD, Washington State University, 1999. Plant Pathology; Plant Pest Management

**Hansen, Neil C.** *Associate Professor*, PhD, University of Minnesota, 1998. Water and Soil Resources

**Hopkins, Bryan G.** *Professor*, PhD, Kansas State University, 1995. Plant and Soil Sciences

**Jellen, Eric N.** *Associate Professor*, PhD, University of Minnesota, 1992. Cytogenetics; Genetic Mapping; Plant Genetic Resource Conservation

**Larsen, Randy** *Assistant Professor*, PhD, Utah State University, 2008. Wildlife Ecology and Management

**Maughan, P. Jeffrey** *Professor*, PhD, Virginia Polytechnic Institute & State University, 1996. Plant Genetics

**McMillan, Brock R.** *Professor*, PhD, Kansas State University, 1999. Population and Community Ecology of Mammals and Birds

**Petersen, Steven L.** *Associate Professor*, PhD, Oregon State University, 2004. Landscape Ecology

**Robinson, Todd F.** *Associate Professor*, PhD, Cornell University, 1998. Growth Biology; Metabolic Processes

**Roundy, Bruce A.** *Professor*, PhD, Utah State University, 1984. Rangeland Restoration and Ecology

**Smith, Thomas S.** *Associate Professor*, PhD, Brigham Young University, 1992. Wildlife Ecology; Wildlife-Human Interactions; Wildlife Management and Ecology

**St. Clair, Samuel** *Associate Professor*, PhD, Pennsylvania State University, 2004. Plant Physiological Ecology

**Stevens, Mikel R.** *Professor*, PhD, University of Arkansas, 1993. Plant Breeding; Molecular Genetics

**Stewart, J. Ryan** *Associate Professor*, PhD, Iowa State University, 2005. Plant Ecophysiology; Bioenergy

**Terry, Richard E.** *Professor*, PhD, Purdue University, 1976. Soil Microbiology; Reclamation and Restoration of Environmentally Disturbed Sites

**Udall, Joshua A.** *Associate Professor*, PhD, University of Wisconsin, 2003. Plant Genetics and Gene Expression

## PSYCHOLOGY

**Chair:** Hedges, Dawson

**Associate Chair/Director of Clinical**

**Training:** Steffen, Patrick R.

**Associate Chair/Graduate**

**Coordinator:** Brown, Bruce L.

**Associate Chair/Faculty:** Lambert, Michael J.

**Executive Coordinator of Clinical Psychology:** Norton, Elizabeth

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[leesa\\_scott@byu.edu](mailto:leesa_scott@byu.edu)

<https://psychology.byu.edu>

## THE PROGRAMS OF STUDY

The mission of the Psychology Department is to discover, disseminate, and apply principles of psychology within a scholarly framework that is compatible with the values and purposes of Brigham Young University and its sponsor.

Two degrees are offered through the Department of Psychology: Psychology-PhD and Clinical Psychology-PhD.

Students are selected after careful consideration of their application; GPA, GRE general test scores, letters of recommendation, and areas of academic interest. The PhD program is designed to be completed in four years and the Clinical PhD program in five years (including a one-year internship).

For more detailed information regarding the Psychology PhD program, click here:<https://psychology.byu.edu/Pages/graduate/PsychPhD.aspx>

For more detailed information regarding the Clinical Psychology PhD program, click here:<https://psychology.byu.edu/Pages/Graduate/ClinicalPsychPhD.aspx>

## Psychology - PhD

The doctoral program in psychology offers a rigorous educational experience leading to the PhD degree. The first four semesters of the program are designed to provide broad acquaintance with the substantive areas of the discipline, training in research skills, and introduction to the particular areas of emphasis offered in the program. During the last two years students will pursue specialized course work and training in one of three main emphasis areas: (1) Applied Social Psychology or (2) Cognitive and Behavioral Neuroscience or (3) Developmental Psychology, and a sub-specialty of Health Psychology. The course of study for students in each emphasis area will require one designated class with the rest to be determined in consultation with the student's dissertation committee.

Applicants should designate one or more potential faculty mentors in their application. By the end of the first semester, all students will have submitted a Program of Study form with the selection of a chair and two other members, each having graduate faculty status, as their dissertation committee. They should begin course work and research in their selected emphasis area in consultation with the dissertation committee chair.

### Requirements for Degree.

- Credit hours (56): Minimum 38 hours of course work plus 18 dissertation hours (799R).
- Required core courses (32 credit hours): B grade or better in Psych 501, 502, 504, 520, 550, 575, 585, 605R (4 semesters), 609, Advanced Seminar (620R, 650R, or 685R) (6 semesters), Advanced Topic (720R, 750R, or 785R).

- The required Advanced Seminar Classes for each emphasis area are: Psych 620R (Advanced Seminar in Developmental Psychology) for Developmental Psychology, Psych 650R (Advanced Seminar in Social Psychology) for Social Psychology, and Psych 685R (Advanced Seminar in Behavioral Neurobiology) for Cognitive and Behavioral Neurosciences.
- The required Advanced Topic classes for each emphasis area are: psych 720R (Advanced Topic in Developmental Psychology) for Developmental Psychology, Psych 750R (Advanced Topic in Social Psychology) for Social Psychology, and Psych 785R (Advanced Topic in Behavioral Neurobiology) for Cognitive and Behavioral Neurosciences.
- Emphasis area requirements and electives (6 credit hours). The required classes for each emphasis area are: Psych 552 (Applied Social Psychology) for Applied Social, Psych 687R (Seminar in Psychopharmacology) for Cognitive and Behavioral Neuroscience and Psych 621 (Advanced Biological Basis of Development) for Developmental Psychology.
- Recommended sequence of program requirements:
- *First Year:* Fall - Psych 501, 550, 605R, Area Advanced Seminar (620R, 650R, or 686R), 799R (1 credit); Winter - Psych 504, 585, 605R, Area Advanced Seminar (620R, 650R, or 686R), 799R (2 credits); Spring - Psych 606, 693 (taught annually only during spring term), Area Advanced Topic (712R, 750R, or 785R).

- *Second Year:* Fall - Psych 502, 575, 605R, Area Advanced Seminar (620R, 650R, or 685R), required area emphasis course (553, 626, or 687) or 1 elective, Winter - Psych 520, 605R, Area Advanced Seminar (620R, 650R, or 685R), required area emphasis course (552, 626, or 687) or 1 elective. Students are required to complete a second year project. Spring-Psych 799R (2 credits).
- *Third Year:* Fall-Area Advanced Seminar (620R, 650R, or 685R), Psych 799R (1.5 credits); Winter - Area Advanced Seminar (620R, 650R, or 685R), 799R (2 credits); Spring - Psych 799R (2 credits). Take any additional course work selected in consultation with the dissertation committee chair. Submit and defend a dissertation prospectus and begin dissertation research in consultation with the dissertation committee chair.
- *Fourth Year:* Fall - Psych 799R (2 credits); Winter - Psych 799R (2 credits); Spring - Psych 799R (2 credits). Complete any remaining courses, complete dissertation research, and author and defend the dissertation. Students must complete 18 hours of dissertation credit (Psych 799R) as part of the dissertation requirement. **Dissertation:** By summer term in their fourth year, students should complete and defend a dissertation in their chosen emphasis area (including a manuscript suitable for submission for publication that is appended to the dissertation). All students should graduate no later than August of their fourth year in the program.

### Psychology - Clinical - PhD

The clinical psychology training program at Brigham Young University leads to the PhD degree and is fully accredited by the Commission on Accreditation, formerly the American Psychological Association Accreditation. (Information on accreditation can

be obtained from the Commission on Accreditation, 202-336-5979, or the Office of Program Consultation and Accreditation, American Psychological Association, 750 First Street, NE Washington, DC 20002-4242, or at [www.apa.org/ed/accreditation/](http://www.apa.org/ed/accreditation/).)

This program is designed to be completed in five years, including a one-year, full-time internship at an approved agency. Candidates with varied backgrounds who have strong academic and clinical promise are encouraged to apply.

The philosophy of the clinical training program adheres to the scientist-practitioner model. Training focuses on academic and research competence as well as theory and practicum experiences necessary to develop strong clinical skills.

The program at Brigham Young University is eclectic in its theoretical approach, drawing from a wide range of theories and orientations in an attempt to give broad exposure to a diversity of traditional and innovative, empirically-supported approaches. All students receive a basic core of training in adult clinical psychology. They may also elect to take a special emphasis in (1) Child, Adolescent, and Family Clinical Psychology, (2) Clinical Neuropsychology, (3) Clinical Research, or (4) Clinical Health Psychology.

#### Requirements for Degree.

- The program requires the development of broad competencies described in the *Handbook of Graduate Programs in the Department of Psychology* and the *Practicum Handbook*. Thus, the program is not merely a series of courses and experiences. In addition to the requirements listed below, the student must demonstrate competence to advance through the various phases of the degree program, including the internship and clearance for graduation.

- Credit hours (111 minimum; B grade or better in each class).
- Research requirements: 8 hours of graduate data analysis (Psych 501, 502); 6 hours of research methodology (Psych 504, 505); 18 hours of dissertation (Psych 799R).
- General core courses: 3 hours of biological bases of behavior (Psych 585); 6 hours of social-cultural bases of behavior (Psych 550, 645 or CPSE 751); 3 hours of cognitive-affective bases of behavior (Psych 575); 3 hours of human development (Psych 520); 3 hours of history and systems (Psych 510); 3 hours of personality (Psych 540), waived if undergraduate course is completed.
- Clinical core courses: 3 hours of ethics and standards (Psych 609); 9 hours of assessment (Psych 622, 623, plus an elective); 12 hours of psychotherapy (Psych 651, 652, 653, 654. Note: 654 is strongly recommended but not required for those in the neuropsychology emphasis area); 4 hours of psychopathology (Psych 611).
- Clinical practica: 19 hours of clinic practica (Psych 741R); 2 hours of clerkships (Psych 743R); 3 hours of case conferences (Psych 740R); 3 hours of externships optional but strongly recommended (Psych 700R); 6 hours of internship (Psych 745, 746, 747, and 748).
- Emphasis sequences: a sequence of elective courses may be taken in the following emphasis areas: Child, Adolescent, and Family Clinical Psychology; Clinical Neuropsychology; Clinical Research; Clinical Health Psychology.
- Second year research project, paper, exam, and presentation.
- Dissertation (including a manuscript in a form suitable for submission for publication appended to the dissertation) to be completed before the internship.

## PSYCHOLOGY

- **Internship:** One-year internship in a setting approved by the clinical director. Before entering the internship, students complete all other requirements.
- **Examinations:** (a) comprehensive examinations in second and third years; (b) oral defense of prospectus and dissertation.

For additional information about the program, write or call the secretary or the director of clinical training, 284 TLRB, Provo, UT 84602-8610, telephone (801) 422-4050.

### FINANCIAL ASSISTANCE

Departmental financial aid is available in various forms: teaching and research assistantships, student instructorships, and tuition stipends.

### RESOURCES AND OPPORTUNITIES

**Comprehensive Clinic.** This clinic is a unique interdisciplinary training and research facility housing audiovisual and computer resources and a staff of skilled technicians and secretaries to support graduate student and faculty research. The clinic currently functions as an APA-approved clinical psychology laboratory for the Psychology Department. In addition, the clinic provides the university and the broader community with mental health services, serving between 200 and 250 clients each week. The clinic contains twelve counseling rooms, four seminar rooms, and two large classrooms equipped with video cameras and portable playback units. Fourteen small session rooms are equipped for audio recording.

**Externship Opportunities.** In addition to practicum experiences in the Comprehensive Clinic, the clinical program arranges a number of reimbursed training placements in community agencies as well as two required unpaid clerkship experiences, including such sites

as Utah State Hospital, Utah State Prison, facilities for children with developmental disabilities, private practices, medical centers, and government agencies. These clerkships and externships are arranged and managed by the executive coordinator of clinical psychology and the director of clinical training and are supervised by on-site licensed professionals, who typically hold affiliated appointments in the Psychology Department. At present, clerkships and externships are available in more than 25 different settings. These opportunities provide an excellent foundation for the integration of classroom experiences with practical work applications.

**Family, Home, and Social Sciences Computing Center.** The center assists faculty and students with data processing and other computing needs on mainframe and personal computers. Technical support and consultation services for both statistics and graphics are available to students working on research projects, theses, and dissertations. Special computer facilities in the Psychology Department support research in psycholinguistics, neuroimaging, neurophysiology, social psychology, and the experimental analysis of human and animal behavior. The FHSS College also provides additional research and academic support through the Camilla Eyring Kimball Chair; the Marjorie Pay Hinckley Chair; and the Mary Lou Fulton Chair.

### COURSE DESCRIPTION

#### PSYCH

##### 501.Data Analysis in Psychological Research 1. (4)

Prerequisite(s): PSYCH 308; or instructor's consent.

Using and interpreting major quantitative methods in psychology; some commonly used computer methods.

##### 502.Data Analysis in Psychological Research 2. (4)

Prerequisite(s): PSYCH 501; or instructor's consent.

Introduction to multivariate data analysis methods, including multivariate analysis of variance, factor analysis, discriminant analysis, multivariate multiple regression, canonical correlation, structural equations modeling, cluster analysis, etc.

##### 504.Research Design. (3)

Prerequisite(s): Concurrent enrollment in Psych 501.

Overview of designs used in psychotherapeutic literature, emphasizing critical analysis of empirical research.

##### 505.Clinical Research. (3)

Prerequisite(s): PSYCH 503 & PSYCH 504; or instructor's consent.

Overview of research examining processes and outcomes of psychological treatments for psychological disorders.

##### 510.History and Systems of Psychology. (3)

Prerequisite(s): PSYCH 210; or equivalent; or instructor's consent.

Survey of origins and development of modern psychology, including consideration of the schools and theoretical systems.

##### 511.Philosophy of Science for the Social Sciences. (3)

Prerequisite(s): Instructor's consent or admission to PhD program.

Issues in philosophy of science as they apply to social sciences, including methods, epistemology, and construction of knowledge.

##### 512.Qualitative Research Methods. (3)

Prerequisite(s): Instructor's consent.

Theories and methods of qualitative research emphasizing philosophical assumptions, question formulation, data gathering, interpretation, and presentation of findings.



**513R.Topics in Behavioral Neuroscience. (3)**

Prerequisite(s): Psych 385 or equivalent or instructor's consent.

Advanced topics and skills in behavioral neuroscience.

**520.Advanced Developmental Psychology. (3)**

Prerequisite(s): PSYCH 320 & PSYCH 321 & PSYCH 322; or equivalent; or instructor's consent.

Major research in developmental psychology, emphasizing theory, content, and methodology.

**531.Organizational Psychology. (3)**

Prerequisite(s): PSYCH 330; or equivalent; or instructor's consent.

Personal and interpersonal aspects of organizational life: goal setting, decision making, problem solving, communication, control, leadership, motivation, and change.

**540.Personality Theory. (3)**

Prerequisite(s): PSYCH 341; or equivalent; or instructor's consent.

Contemporary theories of personality developed within the framework of major psychological systems.

**550.Theory and Research in Social Psychology. (3)**

Prerequisite(s): PSYCH 350; or equivalent; or instructor's consent.

Current theories and research on interaction with others.

**552.Applied Social Psychology. (3)**

Prerequisite(s): PSYCH 352; or equivalent; or instructor's consent.

Overview of domains in which social psychological theory and research have been applied in field settings.

**560.Learning Theory. (3)**

Prerequisite(s): PSYCH 361; or equivalent; or instructor's consent.

Critical review of current theories and persistent issues.

**565.Motivational Psychology. (3)**

Prerequisite(s): PSYCH 365; or equivalent; or instructor's consent.

Theoretical, historical, and empirical overview; recent trends and issues; role of animal studies; methodological issues.

**575.Cognitive Processes. (3)**

Prerequisite(s): PSYCH 370 & PSYCH 375; or equivalents; or instructor's consent.

Theory and research in perception, attention, language, problem solving, and other thinking processes.

**578R.Seminar in Mathematical Psychology. (3)**

Prerequisite(s): PSYCH 308; or equivalent.

Variable topics concerning the application of mathematical and statistical methods to psychology, with emphasis on jointly publishing a methods paper.

**583.Health Psychology. (3)**

Prerequisite(s): PSYCH 381 & PSYCH 382; or equivalents; or instructor's consent.

In-depth examination of behavior from perspective of health and disease

**585.Human Neuropsychology/ Biological Bases of Behavior. (3)**

Prerequisite(s): PSYCH 381 & PSYCH 382; or equivalents; or instructor's consent.

Critical study of brain-behavior relationships.

**605R.Professional Seminar in Psychology. (0.5)**

Prerequisite(s): Acceptance into MS program.

Assessing current research across all domains of psychology and related fields; providing communication and career-seeking skills.

**609.Professional and Ethical Issues in Psychology. (3)**

Prerequisite(s): Acceptance into psychology PhD program or clinical psychology PhD program.

Ethical issues in professional and scientific psychology from a historical and contemporary framework.

**611.Psychopathology. (4)**

Prerequisite(s): Acceptance into clinical psychology program.

Diagnosis and etiology of mental and emotional disorders in children and adults.

**612.Developmental Psychopathology. (3)**

Prerequisite(s): PSYCH 611; Acceptance into clinical psychology program.

Advanced study of etiology, diagnosis, prevalence, associated features, and theories of psychological and developmental disorders in children and adolescents.

**620R.Advanced Seminar in Developmental Psychology. (0.5)**

Prerequisite(s): Acceptance into psychology PhD program.

A critical examination of recent topics and interests within developmental psychology.

**622.Assessment 1: Intelligence. (3)**

Prerequisite(s): Acceptance into clinical psychology program.

Methods used in assessing intellectual status in children and adults.

**623.Assessment 2: Personality. (3)**

Prerequisite(s): Acceptance into clinical psychology program.

Methods used in assessing the personality and behavioral characteristics of children and adults.

## PSYCHOLOGY

### **626.Advanced Biological Bases of Development. (3)**

Prerequisite(s): PSYCH 520

An advanced examination of the biological foundations of social, emotional, perceptual, and cognitive development.

### **627.Advanced Social Development. (3)**

Prerequisite(s): PSYCH 520

An advanced examination of early social and emotional development in children, including parent-child and peer relationships as well as the development of social cognition.

### **628.Advanced Perceptual and Cognitive Development. (3)**

Prerequisite(s): PSYCH 520

An advanced examination of early perceptual and cognitive development in human infants and young children.

### **645.Cultural Diversity and Gender Issues. (3)**

Clinical issues in the context of cultural diversity and contemporary social trends.

### **648R.Role of Theory in Psychotherapy. (3)**

### **650R.Advanced Seminar in Social Psychology. (0.5)**

Prerequisite(s): Acceptance into psychology PhD program.

A critical examination of recent topics and interests within social psychology.

### **651.Psychotherapy 1: Relationship and Psychodynamic. (3)**

Prerequisite(s): Acceptance into clinical psychology program.

Theory and techniques employed in psychotherapy that focus on relationship and psychodynamic approaches.

### **652.Psychotherapy 2: Cognitive - Behavioral. (3)**

Prerequisite(s): Acceptance into clinical psychology program.

Theory, treatment principles, and techniques of cognitive-behavioral therapy.

### **653.Psychotherapy 3: Child and Adolescent. (3)**

Prerequisite(s): Acceptance into clinical psychology program.

Theory and treatment techniques of child and adolescent therapy.

### **654.Psychtherapy 4: Group. (3)**

Prerequisite(s): Acceptance into clinical psychology program.

Theory and techniques of small-group processes.

### **680.Clinical Neuropsychology. (3)**

Prerequisite(s): PSYCH 585; Acceptance into clinical psychology program.

Comprehensive study of the human dysfunctional brain.

### **686R.Seminar in Health Psychology. (3)**

Prerequisite(s): Psych 583 or equivalent or instructor's consent.

Advanced topics in health psychology research and practice.

### **687R.Seminar in Psychopharmacology. (3)**

Prerequisite(s): Psych 585 or equivalent.

Major classes of psychoactive drugs, emphasizing drug-behavioral interactions.

### **693.Teaching Psychology. (3)**

Prerequisite(s): Enrollment in master's or PhD program.

Prepares graduate students for independent teaching experiences.

### **694.Psychology Teaching Practicum. (1)**

Prerequisite(s): PSYCH 693

Lab portion of Psych 693 entailing actual teaching experience and its supervision.

### **695R.Independent Readings. (0.5-3)**

Prerequisite(s): Instructor's consent.

Faculty-supervised readings as arranged by student.

### **697R.Independent Research. (0.5-4)**

Prerequisite(s): Instructor's consent.

Faculty-supervised research as arranged by student.

### **699R.Master's Thesis. (0.5-9)**

Concluding research for master's program, culminating in final oral examination.

### **700R.Externship in Clinical Psychology. (0.5)**

Supervised reimbursed experience in community agencies.

### **711R.Topics in Clinical Psychology (0.5-3)**

Prerequisite(s): Acceptance into clinical psychology program.

Theory and practice in specific topics.

### **711R.Advanced Child Assessment. (0.5-3)**

Prerequisite(s): Acceptance into clinical psychology program.

### **711R.Rorschach Technique. (0.5-3)**

Prerequisite(s): Acceptance into clinical psychology program.

Intensive introduction to Rorschach Inkblot Technique, including administration, coding, scoring, and interpretation as specified in the Exner Comprehensive System.

**712R.Topics in Neuropsychology.** (3)

Prerequisite(s): Acceptance into clinical psychology program.

Current topics, including neuroanatomy and adult and child assessment. Other topics as determined by student interest.

**712R.Neuropsychology Assessment: Adult.** (3)

Prerequisite(s): Acceptance into clinical psychology program.

**712R.Neuropsychology Assessment: Child.** (3)

Prerequisite(s): Acceptance into clinical psychology program.

**712R.Seminar in Neuroanatomy.** (3)

Prerequisite(s): Acceptance into clinical psychology program.

**720R.Advanced Topics in Developmental Psychology.** (3)

Prerequisite(s): PSYCH 620R; instructor's consent.

A critical examination of recent topics and interests within developmental psychology.

**740R.Case Conference.** (0.5)

Prerequisite(s): Acceptance into clinical psychology program.

Case presentations; professional, ethical, and research issues pertinent to assessment and intervention.

**741R.Integrative Practicum.** (0.5-3)

Prerequisite(s): Acceptance into clinical psychology program.

Supervised assessment and intervention, integrating psychopathology diagnosis and treatment.

**742R.Biofeedback.** (3)

Prerequisite(s): Acceptance into clinical psychology program.

**742R.Forensic.** (3)

Prerequisite(s): Acceptance into clinical psychology program.

**743R.Clerkship in Clinical Psychology.** (1)

Prerequisite(s): Acceptance into clinical psychology program.

Supervised experience in community agencies.

**745.Clinical Internship.** (2)

Prerequisite(s): Acceptance into clinical psychology program.

Full-time training at approved mental health agency.

**746.Clinical Internship.** (2)

Prerequisite(s): Acceptance into clinical psychology program.

Full-time training at approved mental health agency.

**747.Clinical Internship.** (1)

Prerequisite(s): Acceptance into clinical psychology program.

Full-time training at approved mental health agency.

**748.Clinical Internship.** (1)

Prerequisite(s): Acceptance into clinical psychology program.

Full-time training at approved mental health agency.

**750R.Advanced Topics in Social Psychology.** (3)

Prerequisite(s): PSYCH 650R; instructor's consent.

A critical examination of recent topics and interests within social psychology.

**785R.Advanced Topics in Behavioral Neuroscience.** (3)

Prerequisite(s): PSYCH 686R; instructor's consent.

A critical examination of recent topics and interests within behavioral neuroscience.

**799R.Doctoral Dissertation.** (0.5-9)

Concluding research for doctoral program, culminating in final oral examination.

**FACULTY**

**Baldwin, Scott A.** *Associate Professor*, PhD, University of Memphis, 2006. Psychotherapy Outcome and Process Research; Quantitative Methodology; Program Evaluation

**Bigler, Erin D.** *Professor*, PhD, Brigham Young University, 1974. Neuropsychology; Neuroanatomy; Neuroimaging

**Birmingham, Wendy** *Assistant Professor*, PhD, University of Utah, 2011. Health Psychology; Relationships and Disease Processes; Social Support, Cancer and Screening Behavior; Cardiovascular Disease

**Braithwaite, Scott R.** *Assistant Professor*, PhD, Florida State University, 2010. Prevention of Marital Dysfunction and the Secondary Consequences that Attend It; The Influence of Close Relationships on Physical and Mental Health; Partner Selection

**Brown, Bruce L.** *Professor*, PhD, McGill University, Canada, 1969. Statistical and Mathematical Methods and Measurement; Psycholinguistics; Theory and Philosophy

**Burlingame, Gary M.** *Professor*, PhD, University of Utah, 1983. Group Therapy; Process and Outcome; Outcome Assessment; Measurement/Methodology

**Carpenter, Bruce N.** *Associate Professor*, PhD, University of Wisconsin, Madison, 1980. Clinical Assessment; Psychopathology; Stress and Coping; Hypersexuality

**Flom, Ross** *Associate Professor*, PhD, University of Minnesota, 1999. Perceptual and Cognitive Development in Human Infants

## PSYCHOLOGY

- Gale, Shawn D.** *Associate Professor*, PhD, Brigham Young University, 1994.
- Gantt, Edwin E.** *Associate Professor*, PhD, Duquesne University, 1998. Philosophical Foundations of Psychological Science; Theories of Religion and Religious Experience; Theories of Altruism and Empathy; Qualitative and Alternative Research Methods; Critical Examination of Naturalistic and Evolutionary Approaches to Psychology
- Hardy, Sam A.** *Associate Professor*, PhD, University of Nebraska-Lincoln, 2005. Adolescent and Adult Development; Personality; Morality; Religiosity; Self and Identity; Agency; Theory and Philosophy
- Hedges, Dawson W.** *Professor*, MD, University of Utah, 1988. Psychiatry; Neuroscience; Electroencephalography
- Higley, J. Dee** *Professor*, PhD, University of Wisconsin, 1985. Developmental Psychopathology, Psychobiology, and Primate Behavior
- Holt-Lunstad, Julianne** *Associate Professor*, PhD, University of Utah, 2001. Social Relationships; Stress and Coping; Psychoneuroendocrinology; Psychophysiology; Health Psychology
- Hopkins, Ramona O.** *Professor*, PhD, University of Utah, 1996. Cognitive Neuroscience and Neurobiological Approaches to Cognition; Brain Imaging; Brain Behavior Relationships Following Anoxia and Brain Injury; Effects of Brain Injury on Emotion; Health Related Quality of Life; and Family Stress Due to Illness
- Jensen, Chad D.** *Assistant Professor*, PhD, University of Kansas, 2011. Clinical Child and Adolescent Psychology, Pediatric Psychology, Pediatric Behavioral Weight Control
- Kirwan, C. Brock** *Assistant Professor*, PhD, Johns Hopkins University, 2006. Memory; Amnesia; Functional Neuroimaging
- Lambert, Michael J.** *Professor*, PhD, University of Utah, 1971. Research in Psychotherapy Process and Outcome; Measuring Treatment Outcomes
- Larson, Michael J.** *Associate Professor*, PhD, University of Florida, 2008. Neuropsychology; Cognitive Neuroscience; Neuroimaging; Cognitive Changes Following Traumatic Brain Injury; Cognitive Processes in Psychopathology such as Obsessive-Compulsive Disorder
- Luke, Steven** *Assistant Professor*, PhD, University of Illinois, 2011. Language processing; Vision; Reading; Eye Movements; Neural Control and Integration of Cognitive Processes
- Lundwall, Rebecca** *Assistant Professor*, PhD, Rice University, 2013. Visual Attention Development; Genetics; Gene-by-Environment Interactions; Cognitive Neuroscience
- Miller Jr., Harold L.** *Professor*, PhD, Harvard University, 1975. Experimental Analysis of Learning and Motivation; Behavioral Economics; Self-control; Evolutionary Psychology; Educational Assessment; Pedagogy; Educational Reform
- Nielsen, Stevan Lars** *Clinical Professor*, PhD, University of Washington, 1984. Developmental Psychology; Quantitative Methods
- Reber, Jeffrey S.** *Associate Professor*, PhD, Brigham Young University, 2000. Critical Thinking; Teaching of Psychology; Altruism; Relational Social Psychology; Religion and Psychology
- Ridge, Robert D.** *Associate Professor*, PhD, University of Minnesota, 1993. Media Influences on Anti- and Prosocial Behavior; Interpersonal Interaction; Applied Social Psychology
- Slife, Brent** *Professor*, PhD, Purdue University, 1981. Conceptual Underpinnings of Personality and Psychotherapy; Relational and Theistic Approaches to Psychology
- South, Mikle** *Associate Professor*, PhD, University of Utah, 2005. Autism Spectrum Disorders; Social Emotion/Motivation, Functional Neuroimaging, Restricted/Repetitive Behaviors and Interests, Diagnostic Issues
- Spangler, Diane L.** *Associate Professor*, PhD, University of Oregon, 1994. Depression; Cognitive Theory; Cognitive Behavioral Therapy; Eating Disorders
- Steffen, Patrick R.** *Associate Professor*, PhD, University of Miami, 1998. Clinical Health Psychology; Stress and Development of Disease; Spiritual and Cultural Factors in Health
- Steffensen, Scott** *Associate Professor*, PhD, University of Utah, 1987. Addiction; Learning/Memory; Anesthesia and Consciousness; Neuroscience
- Warren, Jared** *Associate Professor*, PhD, University of Kansas, 2003. Clinical Child and Adolescent Psychology; Evaluating Child Psychotherapy Outcomes and Processes



**Williams, Richard N.** *Professor,*  
PhD, Purdue University, 1981.  
Theoretical and Philosophical  
Foundations of Psychology

**Yamawaki, Niwako** *Associate*  
*Professor,* PhD, University of Utah,  
2002. Counseling Psychology;  
Gender Role and Sexism; Cross-  
Cultural Studies; Attitude Toward  
Mental Health; Individualism/  
Collectivism

## PUBLIC MANAGEMENT, ROMNEY INSTITUTE OF

**Director:** Thompson, Jeff

760 TNRB, Provo, UT 84602-3158  
(801) 422-4221  
[mpa@byu.edu](mailto:mpa@byu.edu)  
<http://mpa.byu.edu>

### THE PROGRAMS OF STUDY

Administered through the Romney Institute of Public Management, the master of public administration (MPA) program prepares men and women for leadership in the public and nonprofit sectors.

Leadership in this context provides unique opportunities for service to others. The faculty and students of the Romney Institute are dedicated to the philosophy that students should develop excellence in both knowledge and management skills, based on a solid ethical foundation. The success of this philosophy is demonstrated by the wide variety of leadership positions now held by alumni throughout the world in state and local governments, federal agencies, research organizations, business firms, and diverse nonprofit organizations. Graduates are employed in a variety of careers, such as city managers, personnel directors, policy analysts, nonprofit program directors, performance auditors, and finance directors.

Today the public sector is called on to assist in areas that were traditionally the sole domain of profit organizations. Never before has there been a greater need for professionally trained public managers, and never before has there been greater opportunity for dedicated and qualified public managers to provide leadership in shaping the course of human affairs through public institutions and programs.

The Romney Institute offers two programs leading to the MPA degree: full-time and executive. Both are accredited by the NASPAA - The Global Standard in Public Service Education. The full-time program requires two years; approximately fifty students are admitted each year. The executive program is taught one night a week for three years. Approximately forty students are admitted each year.

### *Public Administration - MPA*

The full-time MPA program is designed to provide an understanding of the essential body of knowledge and to develop the basic skills needed for professional management. Such essentials include quantitative analysis, managerial economics, organizational behavior, strategy, human resource management, accounting, budget and finance, ethics, and communication. These skills are taught through practical class and field experiences, case studies, formal and computer simulations, and special workshops and seminars. Second-year courses are designed around an individual's desired area of emphasis. Such areas include: local, state, and federal government management, financial and management analysis, and nonprofit management. Emphasis in each of these concentrations is given to the conceptualization of the larger political and social issues as they relate to the administration of government and nonprofit programs.

### **Requirements for Degree**

- Credit hours: 57
- Required courses: 40 credit hours
- *First-year program:* courses in economic decision making, decision analysis, organizational behavior, communication, administrative environment, budgeting, statistics, finance, human resource management, and career preparation.

- *Second-year program:* courses in ethics, legal issues, and program evaluation.
- *Emphasis courses.* By selecting an area of emphasis (local government management, financial and management analysis, or nonprofit management) a student takes nine credits as specified by the department.
- *Electives:* Courses determined in consultation with advisor.

The preceding does not represent the full range of requirements and opportunities in the program. See professors, academic advisor and career services director for greater detail.

### ***Public Administration - Executive Program - MPA***

Persons with significant public management experience who desire to pursue the master's degree program while continuing to work full-time are encouraged to apply. All courses in the program are offered in the evening, one night a week for three years at the BYU Salt Lake Center.

The executive MPA program consists of successful completion of 45 semester hours of approved course work. Classes are scheduled in such a way that students take six hours per semester (three hours per term). The executive MPA is a general degree and does not offer specialization in functional areas.

### **FINANCIAL ASSISTANCE**

The Romney Institute of Public Management utilizes the Marriott School's financial aid provisions. Qualified MPA students can receive aid from the following: the Marriott School of Management Scholarship Fund, private scholarship donations, assistantship opportunities, and loan assistance.

**Scholarships.** The Marriott School of Management offers scholarships to Marriott School students through the college, departments and programs. One application online at [marriottschool.byu.edu/aid](http://marriottschool.byu.edu/aid) allows students to apply for all scholarships the Marriott School offers.

**Assistantships.** Research and teaching assistantships are available for qualified second-year students.

**Loans.** Several loans are available for Marriott School students:

- Marriott School loans: available to full-time Marriott School day students. Marriott School loans are handled on an individual basis, dependent on financial need and standing within the participating program.
- BYU short-term loans: available for up to the cost of tuition only.
- Federal Stafford loans: subsidized by the U.S. government. Not available for international students.

More information on and applications for these loans are available from the BYU Financial Aid Office, A-41 ASB, (801) 422-4104.

### **RESOURCES AND OPPORTUNITIES**

**The N. Eldon Tanner Building.** The Tanner Building, which houses the Marriott School of Management, is one of the finest facilities of its kind. The original building, with a dramatic seven-story atrium, was updated with a four-story addition. The addition boasts thirty-nine team study rooms, six large case rooms, the Blue Line Deli, and adds 76,000 square feet to the existing building.

**The Marriott School of Management.** The Marriott School is recognized as one of the outstanding management schools in the nation. Faculty are actively engaged in research and publication, and they fill leadership positions in a

number of national professional organizations. The school has developed innovative educational programs that include internships, executive visitation programs, special student consulting and research projects, and other activities designed to bring management education and training closer to management practice. This is accomplished, in part, through the Marriott School's National Advisory Council.

**The National Advisory Council.** Consisting of more than 160 prominent business and government executives, the National Advisory Council lends major support to the Marriott School. Students benefit by interacting with council members in special campus lectures and seminars and by visiting or working with these executives in their respective organizations. Furthermore, the council assists students with placement opportunities, helps develop funding sources for scholarships, and provides professional development for faculty members.

### **COURSE DESCRIPTION**

#### ***P MGT***

##### **519. International Development Policy. (3)**

Prerequisite(s): P MGT 612; or ECON 110; or equivalent

Designing and evaluating policy in international development. Empirical evidence from randomized control trials, best practices in development policy, behavioral economics and models of behavior change, and design thinking.

##### **552. Nonprofit Resource Development. (1.5)**

Resource development skills including grant writing and contract management.

**603. Managerial Accounting and Computer Concepts. (3)**

Accounting systems and processes emphasizing use of management control, financial analysis, decision making, performance evaluation. Spreadsheets and database management.

**612. Economic Decision Making for Managers. (3)**

Basic microeconomic theory and tools applied to strategic decision making and management strategy.

**619R. Seminar in Economic Analysis. (0.5-3)**

Advanced study in economics with variation in topics to meet current needs.

**621. Public and Nonprofit Budgeting. (3)**

Management of public and nonprofit financial resources: budget allocation, control, and planning.

**622. Governmental Finance. (3)**

Acquisition and management of government financial resources such as taxes, user fees, and revenue sharing.

**623. Nonprofit Structure and Tax. (1.5)**

Introduction to the study of nonprofit organizations, including history, philosophy, organizational structure, government relations, tax rules, and applicable laws.

**624. Nonprofit Finance. (1.5)**

Study of the financial structure and income sources for nonprofit organizations, and the applicable laws regulating nonprofit finance.

**625. Debt Management. (3)**

Advanced study of capital markets, debt instruments, bond issues, debt servicing, and financial disclosure requirements.

**626. Budgeting and Finance. (3)**

Exploring policies and systems to guide the acquisition and management of financial resources for governmental functions.

**627. Cash Management and Investments. (3)**

Cash-management systems, policies, and processes in the public-sector; banking services and relationships; and the investment of idle funds.

**628. Public Program Evaluation. (3)**

Principles and methodologies of evaluating programs and assessing program effectiveness in governmental and nonprofit entities.

**629R. Seminar in Financial Management. (0.5-3)**

Advanced study in public-sector financial management and analysis, with variation of topics to address emerging issues and meet current needs.

**630. Statistical Analysis. (3)**

Introduction to research methods and applied basic statistical procedures including sampling, descriptive statistics, inferential statistics, and linear and multiple regression.

**632. Quantitative Decision Analysis. (3)**

Effective decision making using software decision-analysis tools and applications to important managerial decisions.

**634. Data Analysis and Forecasting. (3)**

Using statistical and smoothing models to facilitate decision making in the public, nonprofit, and private sectors. Applying time series and casual modeling to identify and forecast trend, cyclical, and seasonal patterns in revenue, expenditure, and macroeconomic data.

**640. Human Resource Management. (3)**

Current theory and practice of human resource management in the public and not-for-profit sectors.

**641. Organizational Behavior. (3)**

Personal effectiveness in organizations; increased awareness of interpersonal strengths and weaknesses.

**642R. Executive Lectures in Public Management. (0.5-3)****643. Leadership in Public Administration. (3)**

Key aspects of leadership in the public and not-for-profit sectors. Concepts include applied leadership theories, power and politics, conflict, and negotiation.

**648. Advanced Human Resource Management. (3)**

The human resource manager's role in the strategic planning and operation of public and nonprofit organizations. Emerging issues and current trends and practices explored.

**651A. Nonprofit Organization Management 1. (1.5)**

Orienting students to principles of best practice in the management of nonprofit organizations. The course includes topics in nonprofit strategic management, human resource management, and financial management.

**651B. Nonprofit Organization Management 2. (1.5)**

Prerequisite(s): P Mgt 651A.

Application of nonprofit management principles of best practice directly to partner organizations in the community by providing organizational assessments based on the work completed in 651A.

**652.Executive Nonprofit Management. (3)**

Introduction to nonprofit organizations, including history, philosophy, organizational structure, government relations, tax rules, and applicable laws. The financial structure and income sources for nonprofit organizations, and the applicable laws regulating nonprofit finance.

**657R.Nonprofit Board Practicum. (1.5)**

Students serve on the Board of Directors for a local nonprofit.

**659R.Grantwell. (1.5)**

Project-based course exploring real-world issues in philanthropy. Understanding resource development, strategic funding priorities, applicant assessment, grant evaluation, and grant management through projects with large individual and institutional donors.

**662.Communication in Public Administration. (3)**

Crucial communication skills for managers and leaders in public and not-for-profit organizations. Emphasis on writing and oral presentations.

**671.State and Local Government Law. (3)**

Introduction to legal principles involving governmental powers in a federal system, land use, state and local finance, public meetings/records, contracts, and liability for government actions.

**675.Local Government 1: Form of Government and Service Delivery. (3)**

Introduction to the dynamic world of local government. Topics include forms of government, political relationships and policy making, and issues of service delivery.

**676.Local Government 2: Planning, Land Use, and Growth. (3)**

Current issues facing local governments, including planning, land use and zoning, annexation, growth and sprawl, economic development, and other contemporary issues.

**682.Ethics for Management. (3)**

Ethical theory and its application to managerial issues. Ethical conflict and dilemmas and choosing between conflicting goods.

**683.Legal Issues in Public Administration. (3)**

Introduction to legal issues affecting public administration, including the legislative and judicial processes, administrative law, and basic constitutional law.

**684.Administrative Environment. (3)**

Introduction to the process of government and the legal, political, and social environment of public administration.

**685.Management Strategy (3)**

Developing mission and goals, analyzing environment, and assessing and developing organization capacity.

**686.Public Administration Capstone. (3)**

Exploration of critical issues in public administration in the context of the theories presented in the MPA program.

**690R.Public Management Field Study. (1-3)**

Faculty-directed applied research and technical assistance projects for public and nonprofit organizations.

**691R.Readings and Conference. (0.5-3)**

Individualized readings and consultations.

**692R.Directed Research. (0.5-3)**

Application of research methods relative to managers.

**693R.Practicum. (0.5-4)**

Planned application of administrative concepts in a management work situation and analysis of the impact.

**693R.Field Project. (0.5-4)**

**FACULTY**

**Agle, Bradley R.** *Professor*, PhD, University of Washington, 1993. Ethics; Leadership

**Facer, Rex L.** *Associate Professor*, PhD, University of Georgia, 2002. Local Government; Public Budgeting; Leadership

**Hart, David W.** *Associate Professor*, PhD, State University of New York, Albany, 1997. Ethics; Organizational Theory

**Nelson, Ray D.** *Associate Professor*, PhD, University of California, Berkeley, 1975. Finance; Quantitative Methods

**Owens, Bradley P.** *Assistant Professor*, PhD, University of Washington, 2009. Ethics, Organizational Behavior

**Silvia, Chris** *Assistant Professor*, PhD, Indiana University, 2010. Public Management, Quantitative Methods

**Thompson, Jeffrey A.** *Associate Professor*, PhD, University of Minnesota, 1999. Leadership; Ethics

**Turley, Ty** *Assistant Professor*, PhD, University of Chicago, 2013. Development Economics, Experimental Economics



**Wadsworth, Lori L.** *Associate Professor*, PhD, University of Utah, 2003. Human Resource Management; Ethics; Leadership

**Witesman, Eva H.** *Assistant Professor*, PhD, Indiana University, Bloomington, 2008. Nonprofit Management; Public Program Evaluation; Quantitative Methods

## RECREATION MANAGEMENT

**Chair:** Freeman, Patti A.  
**Graduate Coordinator:** Lundberg, Neil R.

W419 TNRB, Provo, UT 84602-2031  
(801) 422-1287  
<http://marriottschool.byu.edu/msrmyl/>

### THE PROGRAMS OF STUDY

**This program is currently fuloughed and not accepting new graduate students**

The Department of Recreation Management and Youth Leadership offers a two-year graduate degree: Youth and Family Recreation-MS. Curriculum focuses on issues related to adolescent development, leadership, youth at risk, leisure philosophy, leisure and family theory, and strengthening families through wholesome recreation. The common goal of the program is to develop expertise and expand knowledge in building strong youth and families through recreation.

Students work closely with faculty in building conceptual models and conducting research that is both theoretical and applied in nature. After completing course work, each student writes a thesis that involves conducting a study related to youth and family recreation.

Students completing their Master's Degree in Youth and Family Recreation will:

- Be prepared to pursue further academic work in doctoral or other advanced degree programs.
- Be prepared to pursue further academic work in doctoral or other advanced degree programs.
- Contribute to the body of knowledge in youth and family recreation through peer-reviewed publication in academic journals and presentation in academic symposia.

- Have opportunities to pursue meaningful careers utilizing their Master's degree training.
- Bless the lives of families, church members, and others in our global community as they apply theoretical knowledge, understanding, and insight related to youth, family, and leisure.

Each spring the department accepts new students - who begin their studies the following September. The average student graduates after two years of course work and completing a thesis.

### Youth and Family Recreation - MS

#### Requirements for Degree.

- Credit hours (33): 27 course work hours, plus 6 thesis hours (RMYL 699R).
- Required courses: MFHD 612, STAT 511, RMYL 601, 610, 611, 612, 613, 699R; 3 hours of committee-approved electives in youth and family graduate-level courses.
- Electives: 3 additional credits upon committee approval.
- Minor (optional): any approved minor.
- Thesis.
- Examinations: oral defense of proposal, oral comprehensive exam and defense of thesis.

### FINANCIAL ASSISTANCE

Graduate awards are available in the form of assistantships and scholarships. Occasionally some graduate faculty members are awarded research grants that may include opportunities for additional paid research assistantships for department graduate students.

## RECREATION MANAGEMENT

### RESOURCES AND OPPORTUNITIES

Departmental graduate student office space includes desks, storage, wireless internet access, printers, a small library, a refrigerator, and phone.

#### Learning Resource Center

This center contains eighteen individual study areas for graduate students as well as computer, audio, and video equipment to assist them in their work.

Opportunities: The department has an affiliation with key family and youth recreation programs that offer excellent research opportunities for graduate students.

### COURSE DESCRIPTION

#### RECM

**599R.Academic Internship.** (0.5-8)  
Prerequisite(s): Instructor's consent.  
Professional leadership practicum.

**601.Theoretical Foundations of Family Recreation.** (3)  
Prerequisite(s): Formal acceptance into recreation management graduate program.  
Historical development, theoretical basis, and applied techniques of family recreation.

**603.Readings in Youth and Family Recreation.** (3)  
Prerequisite(s): Formal acceptance into recreation management graduate program.  
Readings from professional literature and current publications.

**604.Seminar on Youth and Family Recreation.** (3)  
Prerequisite(s): Formal acceptance into recreation management graduate program.  
Intensive investigation and discussion of current issues, problems, and trends in family recreation and youth programs.

**610.Statistical Analysis.** (3)  
Calculating inferential statistics commonly used in applied settings; making decisions regarding hypotheses; employing advanced statistical methodologies including multivariate techniques, path analysis, factor analysis, structural equations and hierarchical linear models, when appropriate. Writing and interpreting research findings.

**611.Philosophy and Social Psychology of Leisure.** (3)  
Prerequisite(s): Graduate status.  
Historical and theoretical roots of developmental youth programs that stress preventative approaches. How to develop character, citizenship, moral and physical fitness, and volunteerism; service learning.

**612.Issues and Applications in Family Recreation.** (3)  
Prerequisite(s): Graduate status.  
Survey of critical issues in family recreation; applying theory to address them.

**613.Graduate Research Seminar.** (3)  
Prerequisite(s): Acceptance to a graduate program.  
Research methods and current issues regarding research methodology. Preparing students to write and defend research proposals.

**699R.Master's Thesis.** (0.5-9)

### FACULTY

**Duerden, Mat** *Assistant Professor*, PhD, Texas A&M, 2009.  
Experience Processes; Youth Development; Outdoor Recreation

**Freeman, Patti A.** *Professor*, PhD, Indiana University, 1993. Leisure Behavior; Family Leisure; Women's Leisure; Outdoor Recreation

**Hill, Brian J.** *Professor*, PhD, Clemson University, 1994. Family Recreation; Marital Recreation; Tourism

**Lundberg, Neil R.** *Associate Professor*, PhD, Indiana University, 2006. Therapeutic Recreation; Adaptive and Inclusive Sport; Marital Satisfaction

**Taniguchi, Stacy** *Associate Professor*, PhD, Brigham Young University, 2004. Outdoor Recreation; Experiential Education; Law and Recreation Law

**Ward, Peter J.** *Associate Professor*, PhD, University of Utah, 2006. Youth Development and Leadership; Recreation Management

**Widmer, Mark A.** *Professor*, PhD, University of Utah, 1993. Therapeutic Recreation; Assessment; Adolescence

**Zabriskie, Ramon B.** *Professor*, PhD, Indiana University, 2000. Therapeutic Recreation; Family Leisure

## RELIGIOUS EDUCATION

*Dean:* Top, Brent

*Chair - Church History and Doctrine:* Bennett, Richard E.

*Chair - Ancient Scripture:* Fronk, Camille

370 JSB, Provo, UT 84602-5690  
801-422-3290

<http://religion.byu.edu/>

### THE PROGRAMS OF STUDY

Religious Education offers one degree: Religious Education-MA. There is one specialization - Seminaries and Institutes. Within Religious Education there are two departments: Ancient Scripture and Church History and Doctrine.

This program only admits students with one or more years of employment in Seminaries and Institutes.

### *Religious Education - MA*

The master's degree in religious education is open to full-time teachers in the LDS Church Seminaries and Institutes system (S&I).

The master's degree is designed to provide advanced preparation for teaching in the LDS Church Seminaries and Institutes system. Emphasis in the core curriculum is placed primarily on five areas: Old Testament, New Testament, Book of Mormon, Doctrine and Covenants, and Latter-day Saint history.

Religious Education admits a maximum of fifteen students to the master's program every other academic year. Course work begins summer term. The program is designed to be completed in three years (two for course work and one for the thesis).

### Requirements for Degree-Seminaries and Institutes Candidates

- Credit hours (36): minimum 30 course work hours plus 6 thesis hours (699R).
- Required courses: Rel A 601, 611, 621; Rel C 624, 625, 640, 650; Rel E 500, 501, 595, 699R.
- Graduate committee must include a three-member committee, including one member from Ancient Scripture faculty and one member from Church History and Doctrine faculty.
- Thesis.
- Examinations: written examination of course work and oral defense of thesis and course work.

### FINANCIAL ASSISTANCE

None listed.

### RESOURCES AND OPPORTUNITIES

**Religious Studies Center.** The dean of Religious Education is also the general director of the Religious Studies Center, which promotes research in ancient studies, the Bible, the Book of Mormon, LDS Church history, the Doctrine and Covenants, the Pearl of Great Price, and world religions.

The center is a supporting and coordinating agency for religion-oriented research throughout the university. Concentrating on research, writing, publication, and other scholarly activities, it is not involved in classroom instruction or degree programs.

**The Richard L. Evans Chair of Religious Understanding.** The occupants of the Richard L. Evans Chair of Religious Understanding

promote understanding among people of different faiths through teaching and other activities. The chair was established to articulate to a broad audience the religious values to which Elder Evans dedicated his life and to promote an enlightening exchange among Latter-day Saints, members of other faiths, and people of good will everywhere.

### COURSE DESCRIPTION

#### REL A

**695R.Directed Readings in Ancient Scripture.** (0.5-3)

#### REL C

**540R.Special Topics in Church History and Doctrine.** (0.5-3)

**630.World Religions and Security Analysis.** (3)

Focuses on how religion influences our national policy and more specifically provides a framework for assessing how religion impacts the military operational environment where chaplains advise commanders.

**631.World Religions and Area Analysis.** (3)

Focuses on areas of conflict where religion influences our national policy, e.g., Islam Taoism, Shintoism, Buddhism, Confucianism, Liberation Theology, etc.

**695R.Directed Readings in Church History and Doctrine.** (0.5-3)

Prerequisite(s): Graduate standing; instructor's consent.

Topics include the Doctrine and Covenants, LDS Church history, LDS doctrine, Christian history, Christian theology, world religions, etc.

## RELIGIOUS EDUCATION

### **695R. Professional Ethical Studies.** (0.5-3)

Prerequisite(s): Graduate standing; instructor's consent.

The principles and practices associated with the ethics of counseling.

### **REL E**

### **500. Educational Philosophy and Values in Religious Education.** (2)

Philosophical basis and underlying values in religious education.

### **501. Scripture Teaching.** (2)

Theory, methodology, and issues of scripture-based teaching in religious education.

### **595. Research Methods in Religious Education.** (3)

Methodology in and resources for research in the four areas of focus: Church History and Doctrine, Old Testament, New Testament, and Book of Mormon.

### **600. Basic Skills in Pastoral Counseling and Chaplain Care Ministry.** (3)

Focuses on the basic skills of pastoral counseling for those wishing to be full-time military chaplains. The emphasis is on pastoral skills in a military setting.

### **600A. Pastoral Counseling Lab.** (1)

Introducing chaplain candidates to basic pastoral counseling skills used in the military. Various models of pastoral counseling; how to provide pastoral counseling in a variety of situations common in a military setting.

### **601. Interfaith Lecture Series.** (1)

To develop a deep and abiding appreciation and understanding of religious faiths, doctrines, practices, spiritual sensitivities, rites and rituals, and fundamental belief systems other than Mormonism. Also to foster an understanding and awareness of how other religions and faith-based traditions function in a modern military setting.

### **602. Ethics, Professional Roles, and Standards for Armed Forces Chaplains.** (3)

Prerequisite(s): Graduate standing; instructor's consent.

Orientation of the chaplaincy as a profession, including the study of standards, roles, ethical/legal issues, and the organizational structure of the Armed Forces Chaplaincy.

### **610. Graduate Seminar on the Old Testament.** (3)

Topics in the Old Testament emphasizing doctrinal, historical, and cultural background.

### **611. Graduate Seminar on the New Testament.** (3)

Topics in the New Testament emphasizing doctrinal, historical, and cultural background.

### **621. Graduate Seminar on the Book of Mormon.** (3)

Topics in the Book of Mormon focusing on doctrine and the historical background of the text.

### **624. Doctrine and Covenants Graduate Seminar.** (3)

Topics in the Doctrine and Covenants, emphasizing doctrinal and historical background.

### **625. LDS Church History Graduate Seminar.** (3)

Topics in LDS Church history, emphasizing contemporary current issues.

### **632. World Religions.** (3)

Doctrines, teachings, world views, and practices of the world's great religions, including Christianity, Islam, Judaism, Buddhism, Hinduism, Confucianism, Sikhism, and Bahai.

### **635. Fundamentals of Religious Studies.** (3)

Exploring ideas about the divine; ways in which religious concepts are expressed in writings, rituals, and belief systems across time and among various cultures from the past to the present.

### **640. History of the Christian Church.** (3)

Background and history of Christianity from the first century A.D. to the present.

### **641. Military Ministry 1: Historical Foundations and Current Practices.** (3)

Prerequisite(s): Available to prospective chaplains only.

Preparation of new military chaplains; learning the historical foundation of the U.S. Armed Forces Chaplaincy, emphasizing a practical ministry within a theological and spiritual context.

### **642. Military Ministry 2: Homiletics.** (3)

Prerequisite(s): REL E 641; Available to prospective chaplains only.

Preparation of new military chaplains; leading worship, preaching, and guiding the teaching ministry within a chapel and operational environment, emphasizing a practical ministry within a theological and spiritual context.



**645. Graduate Seminar in Christian Theological Thought. (3)**

Doctrines about God, Christ, the Trinity, salvation, human beings, sin, grace, the Church, sacraments, and Christian hope in comparison with the restored gospel.

**650. Doctrinal Contributions of the Restoration. (3)**

Doctrinal contributions of the Restoration from Joseph Smith to the present prophets, seers, and revelators; LDS theology and practice.

**688R. Clinical Pastoral Education Practicum. (1-6)**

Prerequisite(s): Available to prospective chaplains only.

Supervised encounters with persons in crisis. Experiencing the interdisciplinary team process of helping persons. Developing skill in interpersonal and interprofessional relationships and a deeper understanding of ministry.

**698. Chaplaincy Comprehensive Final Project. (6)**

Prerequisite(s): Committee consent.

Research project based on an approved topic that has practical ministry application.

**699R. Master's Thesis. (0.5-6)**

Prerequisite(s): Graduate coordinator's consent.

**FACULTY**

**Alford, Kenneth L.** *Associate Professor*, PhD, George Mason University, 2000. Doctrine and Covenants; Family History

**Ball, Terry B.** *Professor*, PhD, Brigham Young University, 1992. Archeobotany; Old Testament

**Baugh, Alexander L.** *Professor*, PhD, Brigham Young University, 1996. LDS Church History-Missouri Period, 1831-1839

**Belnap, Daniel L.** *Associate Professor*, PhD, University of Chicago, 2007. Ancient Near Eastern Studies

**Bennett, Richard E.** *Professor*, PhD, Wayne State University, 1984. LDS Church History

**Chadwick, Jeffrey R.** *Associate Professor*, PhD, University of Utah Middle East Center, 1992. Land of Israel Studies; Biblical Archaeology; New Testament

**Cope, Rachel** *Assistant Professor*, PhD, Syracuse University, 2009. American Religious History

**Dorius, Guy L.** *Associate Professor*, PhD, Brigham Young University, 1994. Family Studies

**Esplin, Scott C.** *Associate Professor*, PhD, Brigham Young University, 2006. Church History and Doctrine

**Fluhman, J. Spencer** *Assistant Professor*, PhD, University of Wisconsin, Madison, 2006. Early Latter-day Saint History; American Religious History

**Freeman, Robert C.** *Professor*, JD, Western State University, 1989. Twentieth-Century Church History

**Gaskill, Alonzo L.** *Associate Professor*, PhD, Trinity Theology Seminary, 2000. Patristics; Symbolism; Catholicism

**Goodman, Michael A.** *Associate Professor*, PhD, Brigham Young University, 2004. Marriage and Family; Mission Preparation

**Hauglid, Brian M.** *Associate Professor*, PhD, University of Utah, 1998. Pearl of Great Price; World Religions

**Holzappel, Richard Neitzel** *Associate Professor*, PhD, University of California, Irvine, 1993. Ancient History

**Huntington, Ray L.** *Professor*, PhD, Brigham Young University, 1995. Sociology- Middle East

**Huntsman, Eric D.** *Associate Professor*, PhD, University of Pennsylvania, 1997. New Testament Studies; Early Christianity

**Jackson, Kent P.** *Professor*, PhD, University of Michigan, 1980. Bible and Near Eastern History

**Judd, Daniel K.** *Professor*, PhD, Brigham Young University, 1987. Religion and Mental Health

**Judd, Frank F.** *Associate Professor*, PhD, University of North Carolina, Chapel Hill, 2003. New Testament

**Largey, Dennis L.** *Professor*, EdD, Brigham Young University, 1981. Book of Mormon

**Livingstone, John P.** *Associate Professor*, EdD, Brigham Young University, 1986. LDS Family and Psychotherapy

**Ludlow, Jared W.** *Associate Professor*, PhD, University of California, Berkeley, 2000. Book of Mormon; New Testament

**Marsh, W. Jeffrey** *Associate Teaching Professor*, PhD, Brigham Young University, 1989. Joseph Smith Translation and Teachings

**Merrill, Byron** *Teaching Professor*, JD, University of California, Davis, 1975. Book of Mormon

**Minert, Roger P.** *Professor*, PhD, Ohio State University, 1991. Book of Mormon; Pearl of Great Price; New Testament

**Muhlestein, Kerry M.** *Associate Professor*, PhD, University of California, 2003. Old Testament; Pearl of Great Price

**Ogden, D. Kelly** *Professor*, PhD, University of Utah, 1982. Hebrew Language; Historical Geography of the Holy Land

## RELIGIOUS STUDIES - MILITARY CHAPLAINCY (PROGRAM)

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**Olson, Camille Fronk** *Professor, PhD,*  
Brigham Young University, 1996.  
Sociology- Middle East

**Ostler, Craig J.** *Professor, PhD,*  
Brigham Young University, 1995.  
Doctrine and Covenants

**Pike, Dana M.** *Professor, PhD,*  
University of Pennsylvania, 1990.  
Near Eastern Studies

**Richardson, Matthew O.** *Professor,*  
EdD, Brigham Young University,  
1996. LDS Marriage and Family

**Seely, David R.** *Professor, PhD,*  
University of Michigan, 1990.  
Near Eastern Studies

**Skinner, Andrew C.** *Professor, PhD,*  
University of Denver, 1986.  
Intertestamental Period; Near  
Eastern History

**Sperry, Kip** *Professor, MLS,*  
Brigham Young University, 1974.  
Genealogy

**Strathearn, Gaye** *Associate Professor,*  
PhD, Claremont Graduate  
University, 2004. New Testament  
and Christian Origins

**Swift, Charles** *Associate Professor,*  
PhD, Brigham Young University,  
2003. Scripture as Sacred  
Literature; Literature as  
Christianity

**Top, Brent** *Professor, PhD,* Brigham  
Young University, 1984. LDS  
Doctrine

**Wayment, Thomas A.** *Associate  
Professor, PhD,* Claremont  
Graduate School, 2000. New  
Testament

**Whitchurch, David M.** *Associate  
Professor, PhD,* Brigham Young  
University, 1991. New Testament;  
Old Testament; Book of Mormon;  
History of English Bible; Biblical  
Geography

**Wilson, Keith J.** *Associate Professor,*  
PhD, University of Utah, 1995.  
Educational Administration

**Woodger, Mary Jane** *Professor, EdD,*  
University of Utah, 1997. LDS  
Women's History

**Woods, Fred E.** *Professor, PhD,*  
University of Utah, 1991. Middle  
Eastern Studies

## RELIGIOUS STUDIES - MILITARY CHAPLAINCY (PROGRAM)

370 JSB, Provo, UT 84602-5690  
801-422-3290  
<http://religion.byu.edu/>

### THE PROGRAMS OF STUDY

The master's degree in Religious Studies is open to military chaplain candidates. The master's degree is designed to provide advanced preparation for service as a military chaplain. Emphasis in the core curriculum is placed primarily on the following areas: Old Testament, New Testament, Book of Mormon, Doctrine and Covenants, Latter-day Saint history, world religions, counseling, and clinical pastoral education. The degree provides the student with a sound historical, doctrinal, and methodological foundation. Chaplain candidates will conclude their program with a comprehensive exam using case studies.

### *Religious Studies - Military Chaplaincy - MA*

The master's degree in Religious Studies is open to military chaplain candidates. The master's degree is designed to provide advanced preparation for service as a military chaplain. Emphasis in the core curriculum is placed primarily on the following areas: Old Testament, New Testament, Book of Mormon, Doctrine and Covenants, Latter-day Saint history, world religions, counseling, and clinical pastoral education. The degree provides the student with a sound historical, doctrinal, and methodological foundation. Chaplain candidates will conclude their program with a comprehensive exam using case studies.

### Requirements for Degree--Chaplain Candidates

- Credit hours (85): minimum 82 course work hours plus 3.0 comprehensive examination hours.
- Required courses: Rel A 601, 611, 621; Rel C 624, 625, 630, 631, 640, 641, 650; 695R; Rel E: 541, 542, 595, 655R, 698. MFT 554, 630, 649, 650, 651, 654, 695R. CPSE: 648, 655, 656, 710
- The graduate committee must include a three-member committee consisting of professors whose courses the candidate has taken.
- Examination: Final comprehensive examination based on case reports.

### FINANCIAL ASSISTANCE

None listed.

### RESOURCES AND OPPORTUNITIES

**Religious Studies Center.** The dean of Religious Education is also the general director of the Religious Studies Center, which promotes research in ancient studies, the Bible, the Book of Mormon, LDS Church history, the Doctrine and Covenants, the Pearl of Great Price, and world religions.

The center is a supporting and coordinating agency for religion-oriented research throughout the university. Concentrating on research, writing, publication, and other scholarly activities, it is not involved in classroom instruction or degree programs.

**The Richard L. Evans Chair of Religious Understanding.** The occupants of the Richard L. Evans Chair of Religious Understanding promote understanding among people of different faiths through teaching and other activities. The chair was established to articulate to a broad audience the religious values to which Elder Evans dedicated his

life and to promote an enlightening exchange among Latter-day Saints, members of other faiths, and people of good will everywhere.

### FACULTY

**Alford, Kenneth L.** *Associate*

*Professor*, PhD, George Mason University, 2000. Doctrine and Covenants; Family History

**Ball, Terry B.** *Professor*, PhD,

Brigham Young University, 1992. Archeobotany; Old Testament

**Baugh, Alexander L.** *Professor*, PhD,

Brigham Young University, 1996. LDS Church History-Missouri Period, 1831-1839

**Belnap, Daniel L.** *Associate Professor*,

PhD, University of Chicago, 2007. Ancient Near Eastern Studies

**Bennett, Richard E.** *Professor*, PhD,

Wayne State University, 1984. LDS Church History

**Chadwick, Jeffrey R.** *Associate*

*Professor*, PhD, University of Utah Middle East Center, 1992. Land of Israel Studies; Biblical Archaeology; New Testament

**Cope, Rachel** *Assistant Professor*,

PhD, Syracuse University, 2009. American Religious History

**Dorius, Guy L.** *Associate Professor*,

PhD, Brigham Young University, 1994. Family Studies

**Esplin, Scott C.** *Associate Professor*,

PhD, Brigham Young University, 2006. Church History and Doctrine

**Fluhman, J. Spencer** *Assistant*

*Professor*, PhD, University of Wisconsin, Madison, 2006. Early Latter-day Saint History; American Religious History

**Freeman, Robert C.** *Professor*, JD, Western State University, 1989. Twentieth-Century Church History

**Gaskill, Alonzo L.** *Associate Professor*,

PhD, Trinity Theology Seminary, 2000. Patristics; Symbolism; Catholicism

**Goodman, Michael A.** *Associate*

*Professor*, PhD, Brigham Young University, 2004. Marriage and Family; Mission Preparation

**Hauglid, Brian M.** *Associate Professor*,

PhD, University of Utah, 1998. Pearl of Great Price; World Religions

**Holzapfel, Richard Neitzel** *Associate*

*Professor*, PhD, University of California, Irvine, 1993. Ancient History

**Huntington, Ray L.** *Professor*, PhD,

Brigham Young University, 1995. Sociology- Middle East

**Huntsman, Eric D.** *Associate Professor*,

PhD, University of Pennsylvania, 1997. New Testament Studies; Early Christianity

**Jackson, Kent P.** *Professor*, PhD,

University of Michigan, 1980. Bible and Near Eastern History

**Judd, Daniel K.** *Professor*, PhD,

Brigham Young University, 1987. Religion and Mental Health

**Judd, Frank F.** *Associate Professor*,

PhD, University of North Carolina, Chapel Hill, 2003. New Testament

**Largey, Dennis L.** *Professor*, EdD,

Brigham Young University, 1981. Book of Mormon

**Livingstone, John P.** *Associate*

*Professor*, EdD, Brigham Young University, 1986. LDS Family and Psychotherapy

## SOCIAL WORK

**Ludlow, Jared W.** *Associate Professor*, PhD, University of California, Berkeley, 2000. Book of Mormon; New Testament

**Marsh, W. Jeffrey** *Associate Teaching Professor*, PhD, Brigham Young University, 1989. Joseph Smith Translation and Teachings

**Merrill, Byron** *Teaching Professor*, JD, University of California, Davis, 1975. Book of Mormon

**Minert, Roger P.** *Professor*, PhD, Ohio State University, 1991. Book of Mormon; Pearl of Great Price; New Testament

**Muhlstein, Kerry M.** *Associate Professor*, PhD, University of California, 2003. Old Testament; Pearl of Great Price

**Ogden, D. Kelly** *Professor*, PhD, University of Utah, 1982. Hebrew Language; Historical Geography of the Holy Land

**Olson, Camille Fronk** *Professor*, PhD, Brigham Young University, 1996. Sociology- Middle East

**Ostler, Craig J.** *Professor*, PhD, Brigham Young University, 1995. Doctrine and Covenants

**Pike, Dana M.** *Professor*, PhD, University of Pennsylvania, 1990. Near Eastern Studies

**Richardson, Matthew O.** *Professor*, EdD, Brigham Young University, 1996. LDS Marriage and Family

**Seely, David R.** *Professor*, PhD, University of Michigan, 1990. Near Eastern Studies

**Skinner, Andrew C.** *Professor*, PhD, University of Denver, 1986. Intertestamental Period; Near Eastern History

**Sperry, Kip** *Professor*, MLS, Brigham Young University, 1974. Genealogy

**Strathearn, Gaye** *Associate Professor*, PhD, Claremont Graduate University, 2004. New Testament and Christian Origins

**Swift, Charles** *Associate Professor*, PhD, Brigham Young University, 2003. Scripture as Sacred Literature; Literature as Christianity

**Top, Brent** *Professor*, PhD, Brigham Young University, 1984. LDS Doctrine

**Wayment, Thomas A.** *Associate Professor*, PhD, Claremont Graduate School, 2000. New Testament

**Whitchurch, David M.** *Associate Professor*, PhD, Brigham Young University, 1991. New Testament; Old Testament; Book of Mormon; History of English Bible; Biblical Geography

**Wilson, Keith J.** *Associate Professor*, PhD, University of Utah, 1995. Educational Administration

**Woodger, Mary Jane** *Professor*, EdD, University of Utah, 1997. LDS Women's History

**Woods, Fred E.** *Professor*, PhD, University of Utah, 1991. Middle Eastern Studies

## SOCIAL WORK

**Director and Graduate Coordinator:** Limb, Gordon E.

**Field Education Director:** Sheffield, Wendy

2190 JFSB, Provo, UT 84602-6709

(801) 422-3282

[msw@byu.edu](mailto:msw@byu.edu)

<http://socialwork.byu.edu/Pages/Home.aspx>

## THE PROGRAMS OF STUDY

*The Master of Social Work program at Brigham Young University is accredited by the Council on Social Work Education.*

The mission of the School of Social Work at Brigham Young University is to support the overall mission of BYU and the Church of Jesus Christ of Latter-day Saints by generating new knowledge and by educating and training students to use the appropriate knowledge, values and skills of the social work profession to serve children and families within their environment and the context of their specific cultures.

## Social Work - MSW

One graduate degree is offered in the School of Social Work: Social Work - MSW. The concentration of curriculum focuses on preparation for **clinical practice and research** with families and children. The School of Social Work MSW curriculum is focused on preparing students to work with families and children, through one of two emphases: Clinical and Research

- **Clinical Emphasis:** Approximately 33-35 students will be admitted to the clinical emphasis each year. Students who apply to this emphasis will become practitioners or clinicians with strong direct clinical practice skills.



Alumni from this emphasis work in mental health and other direct practice settings, go on to receive LCSW licensure, and work toward becoming agency directors and administrators of social work organizations.

- **Research Emphasis:**

Approximately 5-7 students will be admitted to the research emphasis each year. Students who apply to this emphasis are expected to go on for advanced training in top social work PhD programs. Research emphasis students, like those in the clinical emphasis, will receive strong clinical training and, in preparation for PhD level studies, they will 1) take advanced research courses outside of social work as part of their elective requirements (instead of clinical electives), and 2) submit their research project for professional publication. Alumni from this emphasis will go on to become university professors, work in a research or policy arena, or receive advanced clinical training.

### Requirements for Degree

#### *Clinical Emphasis*

- Students entering *without* an undergraduate social work degree (BSW) - Credit Hours: 67 (60 major and 7 elective hours)
- Students entering *with* an undergraduate social work degree (BSW) - Credit Hours: 62 (54 major and 8 elective hours)
- All students are required to complete a Master's Research Project.

#### *Research Emphasis*

- Students entering *without* an undergraduate social work degree (BSW) - Credit hours: 67 (60 major and 7 research elective hours)
- Students entering *with* an undergraduate social work degree (BSW) - Credit hours: 62 (54 major and 8 research elective hours)

- All students are required to complete a Master's Research Project.

*For a more detailed description of the graduate program requirements, see <http://socialwork.byu.edu>.*

### FINANCIAL ASSISTANCE

The BYU School of Social Work offers the following financial aid opportunities: Full- and partial-tuition scholarships, paid research assistant positions, and internships paid by community agencies. Applicants should apply for admission and financial aid concurrently. Notifications of financial aid will be included in the letter of acceptance. Typically, MSW students are offered a financial aid package between \$10,000-\$20,000.

### RESOURCES AND OPPORTUNITIES

The School of Social Work utilizes the **Comprehensive Clinic**, an interdisciplinary training and research facility. The facility houses state-of-the-art video and computer equipment, as well as a staff of skilled technicians and staff to support graduate student and faculty research.

**Faculty research interests** currently include: American Indian child welfare; child welfare; divorce; health care; immigrant families; marriage and families; mental health; mood disorders; poverty; remarriage; school social work; spirituality; substance abuse; women and gender.

**Certification and Licensure:** MSW students can take courses that lead to a Gerontology certificate (Soc W 581), and School Social Work licensure (Soc W 580).

*For a more detailed description of the graduate program requirements, see <http://socialwork.byu.edu>.*

## COURSE DESCRIPTION

### SOC W

#### **570.Crisis Intervention.** (3)

Assessment and intervention in crisis situations with clients.

#### **580.Social Work in the School Setting.** (3)

Overview of knowledge and skills essential to the practice of social work in educational settings; emphasizes practical interventions when working with student/family/teacher/community resources.

#### **581.Social Services for the Aging.** (3)

Process and impact of social service delivery systems on the aged.

#### **585.Global Issues of Children at Risk.** (3)

Analyzing major challenges facing children and their families globally, including poverty, malnutrition, poor health care, gender-based discrimination, child labor and sexual exploitation, AIDS orphans, child soldiers, and refugees.

#### **595R.Directed Readings.** (0.5-3)

Prerequisite(s): Instructor's consent.

#### **602.Statistical and Data Analysis in Social Work Research.** (3)

Analyzing data using commonly used computer methods and interpreting major quantitative and qualitative methods in social work, including regression and multivariate data analysis methods.

#### **603.Research Methods in Social Work.** (3)

Applying quantitative and qualitative social work research. Philosophy of social science, problem formulation, philosophical and epistemological foundations, research designs, ethics, sampling, and data collection methods.

## SOCIAL WORK

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### **604.Advanced Statistics and Data Analysis in Social Work Research. (3)**

Commonly used statistical analyses based on the linear regression model; useful with data or analyses violating one or more assumptions of the OLS regression model. Improved modeling of mediating relationships (SEM), using clustered data, longitudinal data, and issues of selection.

### **605.Advanced Research Methods in Social Work. (3)**

A survey in advanced research methodologies utilized to produce high-quality research in social work and other social sciences. A hands-on methodological training experience focusing on discussions of methodological approaches and designs, real research questions, and empirical papers.

### **611.Clinical Practicum. (3)**

Prerequisite(s): MSW students only.

Client therapy session and clinical supervision in the BYU Comprehensive Clinic, including video taping of student therapy sessions

### **614R.Integrative Field Seminar 1. (1-2)**

Prerequisite(s): Concurrent with Soc W 654R; first-year field placement; MSW students only.

Classroom seminar to examine relationship between theory and practice as it relates to the field experience at the foundational level.

### **615R.Integrative Field Seminar 2. (1)**

Prerequisite(s): Concurrent with Soc W 655R; second-year field placement; MSW students only.

Classroom seminar to examine relationship between theory and practice as it relates to the field experience at an advanced level.

### **620.Human Behavior and Social Environment. (3)**

Prerequisite(s): MSW students only, or instructor's consent.

Persons in their social environment as individuals, members of families, other groups, organizations, and communities. Cultural, social, psychological, biological, spiritual, and physical forces.

### **622.Psychopathology. (3)**

Prerequisite(s): MSW students only, or instructor's consent.

Etiology and symptoms of dysfunctional behavior and their effects on the individual, family, and community.

### **624.Marriage and Family Therapy. (3)**

Prerequisite(s): MSW students only, or instructor's consent.

Various models of marriage and family treatment; appropriate intervention skills.

### **630.Social Welfare Policy. (3)**

Prerequisite(s): MSW students only, or instructor's consent.

Analyzing and changing social policies and programs.

### **631.Family Policy and Law. (3)**

The law relative to formation, functioning, and dissolution of families and delivery of social services to them.

### **654R.Field Internship 1. (1-4)**

Prerequisite(s): Concurrent with Soc W 614R; first-year field placement; MSW students only.

Internship in social service agencies to examine relationship between theory and practice.

### **655R.Field Internship 2. (1-2)**

Prerequisite(s): Concurrent with Soc W 615; second-year field placement; MSW students only.

Internship in social service agencies to examine relationship between theory and practice.

### **660.Direct Practice Skills. (3)**

Prerequisite(s): MSW students only.

Foundation course for graduate-level clinical social work practice with individuals and groups including an overview of the various social work processes within the framework of commonly used models of both individual and group psychotherapy.

### **661.Models of Psychotherapy. (3)**

Prerequisite(s): MSW students only.

Building on skills acquired in SocW 660; specific and predominate psychotherapy models and approaches applied to common diagnoses and clinical populations.

### **662.Group Work Theory. (3)**

Prerequisite(s): Major status; concurrent enrollment in Soc W 620 or bachelor of social work.

Structure, function, dynamics, and development of small groups, emphasizing group models and group theory.

### **663.Advanced Group Work. (3)**

Prerequisite(s): MSW students only.

An integrated classroom experience, linking theory and practice and incorporating social work values and ethics, critical thinking, and social work practice skills (engagement, assessment, intervention, and evaluation techniques) within various contexts.

**664.Community Organization.** (3)  
Prerequisite(s): MSW students only, or instructor's consent.

Process of social interaction and method to maintain adjustment between community resources and needs of members; helping diverse population and people-at-risk to deal more effectively, and bring about change in community.

**665.Organizational Governance and Executive Leadership in Human Services Administration.** (3)  
Prerequisite(s): MSW students only, or instructor's consent.

Key managerial functions of complex organizations and institutions; administrative theory and selected management techniques.

**666.Advanced Practice Skills.** (3)  
Prerequisite(s): SOC W 661; MSW students only.

Linking biopsychosocial assessment to selective intervention strategies. Major diagnoses will be considered in linking assessment to theory and intervention skills.

**667.Intervention Methods with Children and Adolescents.** (3)  
Prerequisite(s): SOC W 661; MSW students only.

Use of intervention methods regarding child and adolescent problems in addition to understanding reciprocal impact of significant systems, i.e., school, family, peers, church, health, socioeconomic status.

**669.Advanced Clinical Practice.** (3)  
Prerequisite(s): MSW students only.

An additional practice course directed to polishing clinical practice skills for a seamless movement into community clinical practice agency settings. The focus will be on addictions and other specialized clinical topics.

**670R.Special Topics in Advanced Clinical Practice.** (1-3)

Prerequisite(s): Instructor's consent.  
Various topics offered as need or interest arises.

**671.Play Therapy.** (3)  
Prerequisite(s): MSW students only, or instructor's consent.

History and development of play therapy; model for practical application and child-centered theoretical approaches; primary emphasis on clinical child-centered play therapy.

**674.Human Sexuality and Social Work Practice.** (3)  
Prerequisite(s): SocW 624 or instructor's consent.

Overview of human sexuality. Introduction to treatment of sexual problems and disorders.

**675.Substance Abuse Treatment.** (3)  
Prerequisite(s): MSW students only, or instructor's consent.

Full spectrum of substance abuse interventions: intervening with selected special populations, such as those who have been sexually abused.

**676.Spirituality in Social Work.** (2)  
Prerequisite(s): Instructor's consent.

Interface of religious and social work values, attitudes, and principles.

**678.Marriage and Family Practice.** (2)

Methods of assessment, planning intervention, and evaluation and termination with marital dyads, family, and community.

**680R.Selected Fields of Practice.** (1-3)  
Prerequisite(s): Instructor's consent.

Current problems and treatments in social work practice.

**680R.Pharmacology.** (2)  
Introduction to foundation of drug interactions from both prescription and natural herb remedies; survival, morbidity, quality of life, neurohormonal changes, symptoms, treatment indications.

**681.Comparative International Social Welfare Policy.** (3)  
Prerequisite(s): MSW students only, or instructor's consent.

Social welfare policies of various countries. Solving global social problems within framework of human rights directives.

**697R.Independent Research.** (1-3)  
Prerequisite(s): Instructor's consent.

Writing for professional publication. Faculty-supervised research for organizing, writing, and submitting the master's research project for publication.

**698R.Master's Research Project.** (1-3)  
Prerequisite(s): MSW students only.

Applying research and statistical methods to evaluative, experimental, and survey studies in social work. Research project of publishable quality required.

## FACULTY

**Limb, Gordon E.** *Associate Professor*, PhD, University of California, Berkeley, 2000. American Indian Child Welfare; Social Work Education; Spirituality

**Roby, Jini L.** *Professor*, JD, MSW, Brigham Young University, 1990. Social Work and Family Law; Social Welfare Policy and Programs

**Shafer, Kevin** *Assistant Professor*, PhD, The Ohio State University, 2009. Divorce and Repartnering; Stepfamilies; Fragile and at-risk Families

## SOCIOLOGY

**Chair:** Jacobson, Cardell  
**Graduate Coordinator:** Dufur, Mikaela

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 margaret\_mccabe@byu.edu  
<http://sociology.byu.edu>

### THE PROGRAMS OF STUDY

The aims of the graduate program in sociology are to educate students in the principles, theories, and methods of sociology; train them in an area of specialization; and create skilled professional teachers and researchers. Faculty in the department are active in producing both quality research and instruction. Graduate students have many opportunities for funding and involvement in research activities. Graduate students may also have opportunities to obtain experience in teaching undergraduate courses (as needed to support the department's course offerings) during the second year of their program.

The Department of Sociology currently offers an MS degree.

The Sociology Department admits an average of eight to twelve students to the master's program each fall semester. Full-time students making good progress in the program are expected to finish a master's degree in two years.

### Sociology - MS

The master's degree prepares students for two career paths: (1) doctoral work beyond the master's degree and (2) professional careers at the master's level as teachers and researchers.

#### Requirements for Degree.

- Credit hours (minimum 35): 29 course hours, including at least 23 hours of formal course work in sociology, plus 6 hours of thesis credits (Soc 699R). Only course work with a grade of B- or better is acceptable.

- Required courses: Soc 600, 604, 605, 610; and for first-year graduate students 598R in fall and winter; minimum 6 additional hours of graduate sociology course work; demonstration of competence in sociological theory, research methods, and statistics.
- Thesis.
- Examination: oral defense of thesis.

### FINANCIAL ASSISTANCE

The Department of Sociology offers graduate teaching and research assistantships. These are semester-long appointments with an expectation of twenty hours of work per week. Renewal of an assistantship is based on making satisfactory progress in the graduate program each semester. Financial assistance is also available through other agencies in the university.

### RESOURCES AND OPPORTUNITIES

The Department of Sociology utilizes as valuable resources the School of Family Life, the survey computer lab, the college computing lab, graduate fellowships, and the Kennedy Center for International Studies. Funding and research opportunities can be sought through the Kennedy Center, Graduate Studies, and other campus and disciplinary entities, as well as through the department.

Faculty research interests cover a broad spectrum of social science research. However, the make-up of the department faculty generates most research in the following areas: family, stratification, social organization and change, gender, ethnicity, community and delinquency.

*For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin or see our Web page at <http://sociology.byu.edu>.*

## COURSE DESCRIPTION

### SOC

**525.Sociology of Religion.** (3)  
 Prerequisite(s): Soc 111, 325, or instructor's consent.

Influences of social factors in the development of various religious systems.

**528.Sociology of Rural Communities.** (3)

Prerequisite(s): Soc 311, 370, or instructor's consent.

Review and critique of major theoretical and methodological approaches to the study of community, with a focus on rural communities.

**590R.Special Topics in Sociology.** (0.5-3)

Prerequisite(s): Instructor's consent.  
 Course content varies from year to year.

**595R.Directed Readings.** (0.5-3)

Individualized reading program supervised by faculty member.

**598R.Pro-Seminar.** (1)

Current developments in sociology including research, proposals, professional meetings, teaching, and finding a job.

**600.Graduate Research Methods.** (3)  
 Prerequisite(s): SFL 290 or Soc 300 or equivalent.

Introduction to philosophy of science, emphasizing research design and development of thesis prospectus, including strengths, limitations, and constraints of various methodologies.

**604.(Soc-MFHD) Ethnographic Research Techniques.** (3)

Prerequisite(s): SOC 600

Rationale, methods, and limitations of qualitative research; includes participant observation and hermeneutic skills.



**605. Multiple Regression Analysis.** (3)

Prerequisite(s): Soc 306 or instructor's consent.

Ordinary least squares and logistic regression techniques. Data acquisition, management, analysis, and report writing.

**606. Intermediate Statistics.** (3)

Prerequisite(s): Soc 306, 605; or equivalents.

Path analysis, factor analysis, and event history techniques.

**608. Seminar in Survey Research and Sociological Measurement.** (3)

Prerequisite(s): SOC 600 & SOC 605; or SOC 600 & SOC 606

Survey research techniques in the behavioral sciences, emphasizing research and sampling designs. Measurement techniques, emphasizing consequences of measurement decisions.

**610. Classical Social Theory.** (3)

Prerequisite(s): Soc 310, 311; or equivalents.

Philosophical foundations of sociological theory; works of major classical theorists such as Marx, Weber, Durkheim, Simmel, Mead, DuBois, Addams, and Parsons.

**611. Contemporary Sociological Theory.** (3)

Prerequisite(s): Soc 310, 311, 610; or equivalents.

Recent developments in sociological theory. In-depth analysis of structure and assumptions of contemporary sociological theories.

**620. Theory and Research in Social Organization.** (3)

Prerequisite(s): Admission to graduate sociology programs; others admitted by instructor's consent.

Graduate survey of the field of social organization and the core subfields therein.

**621. Complex Organizations.** (3)

Prerequisite(s): Instructor's consent.

Theoretical approaches and empirical studies of organizations, their structures, processes, and problems; studies of industrial organizations, universities, hospitals, etc.

**622. Social Stratification.** (3)

Prerequisite(s): Soc 111 or equivalent.

Status, class, and power systems in various societies.

**623. Seminar in Race and Ethnic Relations.** (3)

Major theories of race-ethnic relations; critical issues in the field.

**645. Seminar on Population Analysis.** (3)

Prerequisite(s): Soc 306 or equivalent.

Availability, use, and interpretation of population data for local, state, and national areas applied to planning and evaluation.

**650. Advanced Social Psychology.** (3)

Processes of social influence, emphasizing theory and research testing. Basic principles of social behavior.

**681R. Seminar in Deviance, Crime, and Corrections.** (3)

Prerequisite(s): Soc 380, 381 or 383, or instructor's consent.

In-depth analysis of current issues in the field. Tailored to student interests.

**692R. (Soc-MFHD) Seminar in Family Relationships.** (0.5-3)

Theory and research in topical areas of family study (topics presented on alternate years).

**697R. Directed Research.** (0.5-3)

**699R. Master's Thesis.** (0.5-6)

**706R. (Soc-MFHD) Advanced Statistical Methods.** (3)

Prerequisite(s): Soc 605 or MFHD 605 or Psych 502.

Topics include advanced structural equations and hierarchical linear models, or panel data techniques and generalized linear models.

**799R. Doctoral Dissertation.** (0.5-9)

**FACULTY**

**Bahr, Stephen J.** *Professor*, PhD, Washington State University, 1972. Family; Deviance

**Call, Vaughn R. A.** *Professor*, PhD, Washington State University, 1977. Family Life Course; Research Methods; Aging; Education

**Child, Curtis** *Assistant Professor*, PhD, Indiana University at Bloomington, 2011. Organizations; Economic Sociology; Political Sociology; Social Movements; Civil Society and the Nonprofit Sector; Research Methods

**Dahlin, Eric** *Assistant Professor*, PhD, University of Minnesota, 2010. Organization Innovation, Institutional Change, Creativity, Social Networks, Work-Family Conflict

**Dufur, Mikaela J.** *Associate Professor*, PhD, Ohio State University, 2000. Stratification; Family; Education; Children and Youth; Sport

**Erickson, Lance D.** *Associate Professor*, PhD, University of North Carolina, Chapel Hill, 2005. Life Course; Family; Adolescence

**Forste, Renata** *Professor*, PhD, University of Chicago, 1992. Demography; Family; Child and Adolescent Health

## SPANISH AND PORTUGUESE

**Gibbs, Benjamin** *Assistant Professor*, PhD, Ohio State University, 2009. Social Stratification; Social Mobility, Sociology of Education, Class/Race/Gender

**Heaton, Tim B.** *Professor*, PhD, University of Wisconsin, Madison, 1979. Demography

**Hoffmann, John P.** *Professor*, PhD, State University of New York, Albany, 1991. Criminology; Statistics; Sociology of Religion

**Jacobson, Cardell K.** *Professor*, PhD, University of North Carolina, Chapel Hill, 1971. Social Psychology; American Race/Ethnic Relations; Sociology of Religion

**Knapp, Stan J.** *Associate Professor*, PhD, Florida State University, 1996. Family; Social Theory

**Phillips, Kristie J. R.** *Assistant Professor*, PhD, Vanderbilt University, 2005. Sociology of Education (emphasizing urban education); Education Policy; School Choice and Geographic Distribution of Social Resources

**Rees, Carter** *Assistant Professor*, PhD, University of Albany, State University of New York, 2011. Juvenile Delinquency; Social Networks; Social Influence; Statistical Methodology

**Rugh, Jacob S.** *Assistant Professor*, PhD, Princeton University, 2012. Race and Ethnicity; Segregation; Stratification; Urban Sociology; Immigration

**Sanders, Scott R.** *Assistant Professor*, PhD, Cornell University, 2013. Demography; Poverty; Health Care

**Ward, Carol J.** *Associate Professor*, PhD, University of Chicago, 1992. Race and Ethnic Relations; Education; Community; Social Change; Applied Research Methods (qualitative and quantitative)

## SPANISH AND PORTUGUESE

**Chair:** Laraway, David  
**Graduate Coordinator:** Williams, Lynn  
**Associate Graduate Coordinator:** Larson, Erik Matthew

3190 JFSB, Provo, UT 84602-6705  
(801) 422-2196  
<http://spanport.byu.edu/home.php>

### THE PROGRAMS OF STUDY

Two degrees are offered through the Department of Spanish and Portuguese: Portuguese-MA and Spanish-MA.

Most students who complete a master's degree in the department either seek jobs in secondary education or continue their studies on the PhD level. Some have located positions with government agencies or in the business sector. Each year about fifteen students are admitted to the program.

The program is designed for a student to complete the degree in twenty-four months of intensive work.

### Portuguese - MA

Students must choose one of the following areas of specialization before applying to the program: Luso-Brazilian Literatures, Portuguese Linguistics, and Portuguese Pedagogy

#### Requirements for Luso-Brazilian Literatures Specialization:

- Credit hours: 33.
- Core required courses: 21 hours, including Port 601B, three 1-credit mini-courses (2 in literature and one in linguistics, pedagogy, or literature), and five courses in Luso-Brazilian Literature.
- Electives (6 hours): 3 hours in Portuguese linguistics and 3 hours in pedagogy. (Span/Port 673R does not count toward this requirement.)

- Thesis or two-paper option: 6 credit hours of Port 699R, plus an oral defense.
- Examinations: comprehensive, culminating written exam in specialty.
- Completion of three semesters (college level or equivalent) of a second foreign language other than English in addition to language of specialization.
- Teaching requirement: teach at least one Spanish or Portuguese language class (100/200 level).

#### Requirements for Portuguese Linguistics Specialization:

- Credit hours: 33.
- Core required courses: 18 hours, including Port 601A, Port 520, Span/Port 625, and Span/Port 626, either Port 521 or Port 522, and either Port 529R, Span 622, or Span 629R.
- Electives (9 hours): 6 hours in Luso-Brazilian literature and 3 hours in pedagogy. (Span/Port 673R does not count toward this requirement.)
- Thesis or two-paper option: 6 credit hours of Port 699R, plus an oral defense.
- Examinations: comprehensive, culminating, written exam in specialty.
- Completion of three semesters (college level or equivalent) of a second foreign language other than English in addition to language of specialization.
- Teaching requirement: teach at least one Spanish or Portuguese language class (100/200 level).

#### Requirements for Portuguese Pedagogy Specialization:

- Credit hours: 33.

- Core required courses: 18 hours, Span 601C, 671, 676; two courses in Spanish or Portuguese pedagogy; and three 1-credit mini-courses (2 in pedagogy and one in literature, linguistics, or pedagogy). (Span/Port 673R does not count toward the core requirement).
- Electives (9 hours): 3 hours in Hispanic linguistics and 6 hours in Luso-Brazilian literature.
- Thesis or project option: 6 credit hours of Port 699R, plus an oral defense.
- Examinations: comprehensive, culminating written exam in specialty.
- Completion of three semesters (college level or equivalent) of a second foreign language other than English in addition to language of specialization.
- Teaching requirement: teach at least one Spanish or Portuguese language class (100/200 level).

### **Spanish - MA**

Students must choose one of the following areas of specialization before applying to the program: Hispanic Literatures, Hispanic Linguistics, and Spanish Pedagogy.

#### **Requirements for Hispanic Literatures Specialization:**

- Credit hours: 33.
- Core required courses: 21 hours, including Span 601B, three 1-credit mini-courses (2 in literature and one in linguistics, pedagogy, or literature), and five courses in Peninsular or Spanish American literature. At least two courses must be taken from each of the two regional emphases. (Span 638 and 602 may not be used to fulfill this minimum regional requirement.)

- Electives (6 hours): 3 hours in Hispanic linguistics and 3 hours in Spanish pedagogy. (Span 673R does not count toward this requirement.)
- Thesis or two-paper option: 6 credit hours of Span 699R, plus an oral defense.
- Examinations: comprehensive, culminating written exam in specialty.
- Completion of three semesters (college level or equivalent) of a second foreign language other than English in addition to language of specialization.
- Teaching requirement: teach at least one Spanish language class (100/200 level).

#### **Requirements for Hispanic Linguistics Specialization:**

- Credit hours: 33.
- Core required courses: 21 hours, including Span 601A, 625, and 626, three 1-credit mini-courses (2 in linguistics and one in literature or pedagogy), and three courses in Hispanic linguistics.
- Electives (6 hours): 3 hours in Peninsular or Spanish American literature and 3 hours in Spanish pedagogy. (Span 673R does not count toward this requirement.)
- Thesis or two-paper option: 6 credit hours of Span 699R, plus an oral defense.
- Examinations: comprehensive, culminating, written exam in specialty.
- Completion of three semesters (college level or equivalent) of a second foreign language other than English in addition to language of specialization.
- Teaching requirement: teach at least one Spanish language class (100/200 level).

#### **Requirements for Spanish Pedagogy Specialization:**

- Credit hours: 33.
- Core required courses: 21 hours, Span 601C, 671, 676; three courses in Spanish Pedagogy; and three 1-credit mini-courses (2 in pedagogy and one in literature, linguistics, or pedagogy). (Span 673R does not count toward the core requirement).
- Electives (6 hours): 3 hours in Hispanic linguistics and 3 hours in Peninsular or Spanish American literature.
- Thesis or project option: 6 credit hours of Span 698R or 699R, plus an oral defense.
- Examinations: comprehensive, culminating written exam in specialty.
- Completion of three semesters (college level or equivalent) of a second foreign language other than English in addition to language of specialization.
- Teaching requirement: teach at least one Spanish language class (100/200 level).

### **FINANCIAL ASSISTANCE**

Students may receive a position as a student instructor depending on departmental needs and on their qualifications. All potential student instructors must have completed an undergraduate 3-hour phonetics course and a 3-hour methodology course, and they must participate in an intensive workshop held during the week previous to the commencement of fall classes. Continuing employment and the number of sections assigned to candidates each semester depend on department needs and on the students' performance as instructors and on their own academic progress. Additionally, most students receive partial scholarship grants (generally 65-85% of required courses) to help cover tuition expenses.

## RESOURCES AND OPPORTUNITIES

The Department of Spanish and Portuguese utilizes the Office of Digital Humanities for world-class computer-assisted language instruction. Students may choose to participate in a variety of Study Abroad programs conducted by the department in Europe and Latin America.

Faculty research interests currently include:

- Acquisition of Spanish as a second language (language teaching methodology, teacher training, oral proficiency testing, computer-administered placement and speaking tests)
- Hispanic literature (Spanish medieval literature, Spanish Golden Age literature, eighteenth- and nineteenth-century Spanish literature, Spanish American women writers, Spanish women writers, Hispanic film, Spanish American poetry, modern Spanish poetry, literature and philosophy, contemporary Hispanic theatre, Mexican prose, metafiction and metatheatre, Hispanic romanticism, Spanish realist narrative, intersemiotic analogies, literature and science, Spanish cultural studies)
- Portuguese literature (classical Portuguese literature, Brazilian literature)
- Hispanic linguistics (Caribbean sociolinguistics, phonetic spectrography; Romance semantics, Hispanic paleography, mood in the nominal clause, language contact, bilingualism)

*For a more detailed description of the graduate program requirements, send for a copy of the department's prospective student packet.*

## COURSE DESCRIPTION

### PORT

#### 520.Advanced Portuguese Grammar. (3)

Prerequisite(s): Port 326 or 329.

Applying contemporary grammatical concepts to problems in Portuguese grammar.

#### 521.Romance Philology. (3)

Prerequisite(s): Port 326 or 329.

Comparative study of evolution of Latin into modern romance languages.

#### 522.History of the Portuguese Language. (3)

Prerequisite(s): Port 326 or 329.

Linguistic sources that contributed to formation of Portuguese.

#### 529R.Special Topics in Portuguese Linguistics. (3)

Prerequisite(s): Port 326 or 329, or instructor's approval.

Topics from semantics to dialectology to sociolinguistics.

#### 599R.Academic Internship: Portuguese Internship. (1-3)

Prerequisite(s): Port 321; instructor's consent.

#### 601A.Portuguese Linguistics and Research Methodology. (3)

Basic research fields in linguistics (i.e., phonology, philology, syntax, psycholinguistics), how research differs in each area, and specific theoretical issues associated with each. Bibliographical and field research methods and techniques of reporting findings.

#### 601B.Literary Theory and Research Methodology. (3)

Introduction to literary theory, emphasizing major theoretical movements and strategies of literary interpretation. Bibliographical techniques, research methodology, and issues pertaining to the profession.

#### 601C.Portuguese Language Teaching Research Procedures. (3)

#### 625.Portuguese Morphosyntax. (3)

Linguistic study of morphological and syntactic structure of Portuguese.

#### 626.Portuguese Phonetics and Phonology. (3)

Prerequisite(s): Port 326 or equivalent.

Systematic study of articulatory and acoustic Portuguese phonetics and of structural and generative approaches to phonological description of Portuguese.

#### 638.Luso-Brazilian Cinema. (4)

Prerequisite(s): Port 321 & 322 or equivalents.

Introduction to the study of film; background in appreciating the best of motion picture art in Brazil, Portugal, and other Lusophone countries.

#### 639R.Luso-Brazilian Theatre Production. (3)

Theory and practice of dramatic performance. Includes participation in a play to be performed during semester.

#### 642.Camoes. (3)

#### 647.Fernando Pessoa and Portuguese Literature. (3)

Seminar on one of the major European poets of the twentieth century and the only Portuguese poet on a par with Camoes.

#### 649R.Seminar in Portuguese Literature. (3)

#### 652.Machado de Assis. (3)

Prerequisite(s): Port 441, 451; or equivalents.



**653.Twentieth-Century Brazilian Literature. (3)**

Prerequisite(s): Port 441, 451; or equivalents.

**659R.Seminar in Brazilian Literature. (3)****661R.African Literature in Portuguese. (3)**

Modern authors from the five African nations whose official language is Portuguese: Angola Cabo Verde, Guine Bissau, Mozambique, and Sao Tome Principe. Authors include Jose Craveirinha, Mia Couto, Noemia de Sousa, Jose Tenreiro, Castro Soromenho, Luandino Vieira, Pepetala, Baltasar Lopes, among others.

**662R.Literature of the Lusophone World. (3)**

Authors from the eight nations whose official language is Portuguese, plus former colonies and regions of important Portuguese influence. Included are Luso-American and Azorean writers, as well as authors from East Timor (formerly Indonesia), Goa (India), and Macau (China).

**673R.Directed Teaching of Portuguese. (1-3)**

Prerequisite(s): Teaching assistantship in department.

Supervised, practical experience in teaching Portuguese at the college level.

**674.Teaching Lusophone Cultures. (3)**

Methods of researching and teaching Lusophone cultures.

**679R.Seminar in Teaching Portuguese. (3)**

Topics vary. In-depth discussion about issues relating to language teaching and research.

**680R.Directed Research in Portuguese. (1-3)**

Prerequisite(s): Written proposal subject to departmental approval.

Under direction of faculty member, designing and conducting research project that covers material not normally presented in regular course work. Research paper required.

**698R.Master's Project. (1-6)****699R.Master's Thesis. (1-9)****SPAN****520.Problems in Spanish Grammar. (3)**

Prerequisite(s): SPAN 326; or SPAN 329

Application of contemporary grammatical concepts to problems in Spanish grammar.

**521.Romance Philology. (3)**

Prerequisite(s): SPAN 326; or SPAN 329

Comparative study of the evolution of Latin into modern Romance languages.

**522.History of the Spanish Language. (3)**

Prerequisite(s): SPAN 326; or SPAN 329

Linguistic sources that contributed to formation of the Spanish language.

**529R.Special Topics in Spanish Linguistics. (3)**

Prerequisite(s): SPAN 326; or SPAN 329

Topics include semantics, dialectology, and sociolinguistics.

**577.Spanish Language Teaching Procedures. (3)**

Prerequisite(s): For public school teachers.

Mastery of skills specific to foreign language instruction. Lectures, demonstrations, practical experience.

**599R.Academic Internship: Spanish Internship. (0.5-3)**

Prerequisite(s): SPAN 321

**601A.Hispanic Linguistics and Research Methodology. (3)**

Basic research fields in linguistics (i.e., phonology, philology, syntax, psycholinguistics), how research differs in each area, and specific theoretical issues associated with each. Bibliographical and field research methods and techniques of reporting findings.

**601B.Literary Theory and Research Methodology. (3)**

Introduction to literary theory, emphasizing major theoretical movements and strategies of literary interpretation. Bibliographical techniques, research methodology, and issues pertaining to the profession.

**601C.Research Designs in Hispanic Language Teaching. (3)**

Designing and evaluating empirical research studies in foreign language learning and teaching methodology. Bibliographical techniques and methods of reporting findings.

**602R.Special Topics in Contemporary Literary Theory. (3)**

Prerequisite(s): Instructor's consent.

Topics, figures, themes, and movements in contemporary theory as they relate to Hispanic literatures, cultures, and film.

**622.Hispanic Dialectology. (3)**

Overview of the varieties of spoken Spanish.

**625.Spanish Morphosyntax. (3)**

Linguistic study of morphological and syntactic structure of Spanish.

## SPANISH AND PORTUGUESE

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### **626.Spanish Phonetics and Phonology (3)**

Prerequisite(s): Span 326 or instructor's consent.

Systematic study of articulatory and acoustic Spanish phonetics and of structural and generative approaches to phonological description of Spanish.

### **629R.Seminar in Spanish Linguistics. (3)**

### **638.Hispanic Cinema. (3)**

Prerequisite(s): Span 339 or equivalent.

Introduction to study of film; background in appreciating best of motion picture art in Spain and Spanish America.

### **639R.Hispanic Theatre Production. (3)**

Prerequisite(s): Director's consent.

Theory and practice of dramatic performance. Includes participation in play to be performed during semester.

### **640.Medieval Spanish Literature. (3)**

Prerequisite(s): Span 441 or equivalent.

Spanish Literature from El Cantar de Mio Cid (1140) through La Celestina (1499).

### **643R.Golden Age Literature. (3)**

Prerequisite(s): Span 441 or equivalent.

Sixteenth- and seventeenth-century Spanish literature.

### **644.Don Quijote. (3)**

Prerequisite(s): Span 441 or equivalent.

In-depth study of Cervantes's El ingenioso hidalgo don Quijote de la Mancha.

### **646R.Nineteenth-Century Spanish Literature. (3)**

Prerequisite(s): Span 441 or equivalent.

Romanticism (1770s through 1870s) and/or the novels of Benito Perez Galdos and his contemporaries.

### **648R.Twentieth-Century Spanish Literature. (3)**

Prerequisite(s): Span 441 or equivalent.

Genre (twentieth-century novel, drama, or poetry) or particular school (Generation of 1898, Generation of 1927, etc.)

### **649R.Seminar in Spanish Literature. (3)**

### **650R.Early Spanish American Literature. (3)**

Prerequisite(s): Span 451 or equivalent.

Indigenous literature (Maya, Nahuatl, etc.) and other texts written in Spanish colonial America through eighteenth century.

### **654R.The Spanish American Novel. (3)**

Prerequisite(s): Span 451 or equivalent.

Selected Spanish American novelists such as Juan Rulfo, Gabriel Garcia Marquez, Alejo Carpentier, Mario Vargas Llosa, etc.

### **655R.Spanish American Poetry. (3)**

Prerequisite(s): Span 451 or equivalent.

Selected Spanish American poets, movements, and national traditions.

### **656R.Spanish American Drama. (3)**

Prerequisite(s): Span 451 or equivalent.

Twentieth-century theatre from Spanish America and Brazil.

### **658R.The Hispanic-American Short Story (3)**

Prerequisite(s): Span 451 or equivalent.

Introduction and development of an important literary genre in Spanish America, including works of Jorge Luis Borges, Julio Cortazar, Juan Rulfo, Gabriel Garcia Marquez, and others.

### **659R.Seminar in Spanish American Literature. (3)**

### **661.Spanish-Speaking American (Mexican-American) Literature. (3)**

Prerequisite(s): Span 451 or instructor's consent.

Spanish-English literature of Mexican-Americans within the United States.

### **670R.Teaching Oral and Literacy Skills in a Foreign Language. (3)**

Examining, in alternate years, theory and techniques for teaching oral skills (speaking and listening) and literacy skills (reading and writing) in a foreign language.

### **671.Principles of Foreign Language Learning and Teaching. (3)**

Basic theories and principles of language learning and teaching. History, current research, practices, trends, and issues.

### **672.Media and Technology in Foreign Language Instruction. (3)**

Applying modern technology and instructional media in teaching foreign languages.

### **673R.Directed Teaching of Spanish. (1-3)**

Prerequisite(s): Span 326, 377 (or equivalents); graduate assistantship in department.

Supervised, practical experience in teaching Spanish at the college level.

### **674.Teaching Hispanic Culture. (3)**

Methods of researching and teaching Hispanic culture.

### **676.Assessing Language and Culture Learning. (3)**

Methods of assessing language and culture learning, including the development of tests, questionnaires, portfolios, self- and peer-assessments, rubrics, and checklists.

**679R.Seminar in Teaching Spanish.** (3)

Topics vary. In-depth discussion about issues relating to language teaching and research.

**680R.Directed Research in Spanish.** (1-3)

Prerequisite(s): Written proposal subject to departmental approval.

Individualized study. Under direction of faculty member, designing and conducting research project that covers material not normally presented in regular course work. Research paper required.

**698R.Master's Project.** (1-6)

Prerequisite(s): Committee chair's consent.

Candidates in nonthesis program may complete approved field project as their writing/research experience.

**699R.Master's Thesis.** (0.5-9)

**FACULTY**

**Alba, Orlando** *Professor*, PhD, Universidad Complutense de Madrid, Spain, 1988. Hispanic Sociolinguistics; Dialectology

**Alvord, Scott M.** *Associate Professor*, PhD, University of Minnesota, 2006. Hispanic Linguistics; Phonetics; Phonology; Sociolinguistics; Language Contact; Spanish in the U.S.

**Bateman, Blair E.** *Associate Professor*, PhD, University of Minnesota, 2002. Teaching Culture; Language Teaching Methodology; Portuguese Pedagogy; Immersion Education

**Fails, Willis C.** *Associate Professor*, PhD, University of Texas, Austin, 1984. Experimental Phonetics; Spanish and Portuguese Linguistics

**Fitzgibbon, Vanessa** *Assistant Professor*, PhD, University of Wisconsin, Madison, 2006. Contemporary Brazilian Literature; Brazilian Identity, Culture, and History; Luso-Brazilian Literature, Theater and Film

**Garcia, Mara Lucy** *Professor*, PhD, University of Kentucky, 1997. Latin American Literature; Contemporary Women Writers; Andean Writers; Fantastic Literature

**Hague, Daryl R.** *Associate Professor*, PhD, State University of New York, Binghamton, 2002. Translation Theory and Pedagogy

**Hegstrom, Valerie** *Associate Professor*, PhD, University of Kansas, 1992. Early Modern Spanish Literature; Spanish Theater Performance; Women Writers; Women's Studies

**Knapp, Nieves Perez** *Associate Teaching Professor*, PhD, University of Oviedo, Spain, 2003. Spanish Language and Cultures; Language Teaching Methodology; Materials Development

**Krause, James R.** *Assistant Professor*, PhD, Vanderbilt University, 2010. Brazilian and Spanish American Narrative and Poetry; Comparative Latin American & Inter-American Literature; Translation Studies

**Laraway, David** *Associate Professor*, PhD, Cornell University, 1998. Spanish American Poetry, Philosophy, Basque Literature and Culture, Borges

**Larson, Erik M.** *Assistant Professor*, PhD, University of California, Davis, 2012. Latin American Literature; Contemporary Southern Cone Narrative; Detective Literature and Roman Noir; Post-Dictatorial Literature; Critical Theory

**Lopez-Alcala, Samuel** *Assistant Professor*, PhD, Universidad Pontificia Comillas, Madrid, 2012. English into Spanish Translation and Interpreting

**Lund, Christopher C.** *Professor*, PhD, University of Texas, Austin, 1974. Classical Portuguese Literature

**Martinsen, Rob A.** *Associate Professor*, PhD, University of Texas, Austin, 2007. Foreign or Second Language Acquisition/Teaching Methods; Teaching and Learning Languages through Study Abroad and Technology

**Montgomery, Cherice** *Assistant Professor*, PhD, Michigan State University, 2009. World Language Education, Pedagogy, and Curriculum Development; Transliteracy and Social Technologies; Professional Development; Arts-informed Education and Inquiry; Teacher Preparation

**Nielson, Rex** *Assistant Professor*, PhD, Brown University, 2010. 19th, 20th, and 21st Century Brazilian Narrative; Portuguese and Luso-African Literature; Comparative Literature; Masculinity Studies; Ecocriticism

**Pratt, Dale J.** *Professor*, PhD, Cornell University, 1994. Nineteenth- and Twentieth-Century Spanish Literature; Realism; Generation of '98; Literature and Science; Theatre Performance; Comparative Literature; Science Fiction

**Rosenberg, John R.** *Professor*, PhD, Cornell University, 1985. Nineteenth- and Twentieth-Century Spanish Literature; Art and Literature

**Sherman Jr., Alvin F.** *Professor*, PhD, University of Virginia, 1990. Eighteenth- and Nineteenth-Century Spanish Literature; 21st Century Spanish Literature; Medieval Literature; Romanticism; Spanish Civil War

## STATISTICS

**Smead, Robert N.** *Associate Professor*, PhD, University of Texas, Austin, 1988. Spanish-English Language Contact; Hispanic Bilingualism; Spanish Linguistics; Variationism

**Stallings, Gregory C.** *Associate Professor*, PhD, University of California, Irvine, 1999. 20th and 21st Century Spanish Literature and Film

**Thompson, Gregory L.** *Assistant Professor*, PhD, University of Arizona, 2006. Second Language Acquisition; Code-Switching in the Foreign Language Classroom; Heritage Language Learners; Service-learning and Language Acquisition; Bilingualism and Languages in Contact; Placement Exams and Language Testing

**Turley, Jeffrey S.** *Associate Professor*, PhD, University of California, Berkeley, 1992. Spanish Linguistics; Romance Philology; Semantics

**Weatherford, Douglas J.** *Associate Professor*, PhD, Pennsylvania State University, 1997. Contemporary Spanish American Narrative; Colonial Literature; Historical Novel; Hispanic Film

**Williams, Frederick G.** *Gerrit de Jong, Jr, Distinguished Professor of Luso-Afro-Brazilian Studies*, PhD, University of Wisconsin, 1971. Portuguese, Brazilian, and Mozambican Literatures

**Williams, Lynn** *Professor*, PhD, University of London, 1978. Spanish Linguistics; History of the Spanish Language; Spain as a Multilingual State; Medieval Literature; Seventeenth-Century Diplomatic History

## STATISTICS

**Chair:** Tolley, Dennis

**Graduate Coordinator:** Fellingham, Gilbert W.

223 TMCB, Provo, UT 84602-6575  
(801) 422-4506

<http://statistics.byu.edu/content/master-science-statistics>

### THE PROGRAMS OF STUDY

Statistics is a scientific discipline by which statisticians assist other scientists and researchers in making informed decisions in the face of uncertainty. Statisticians use skills in a variety of areas to solve problems. The application of statistics is the embodiment of the scientific method.

The statistics MS prepares outstanding students for successful and productive careers, and to enroll in the best Ph.D. programs. A firm foundation in theoretical statistics is provided and the courses offer approaches to the solution of important real-world problems.

The Statistics Integrated BS/MS program allows well-prepared students to complete both degree programs efficiently and at a lower tuition cost. Majors in the Statistical Science and Biostatistics emphases can apply for the integrated program after taking Stat 330 and Stat 340 and completing University Core requirements.

Roughly twelve students are accepted into the statistic's masters program each fall. Students are expected to complete the master's program in two years.

### Statistics - MS

#### Requirements for Degree.

- Credit hours: Thesis option (30): minimum 24 course work plus 6 thesis hours (Stat 699R). Project option (33): minimum 30 course work plus 3 project hours (Stat 698R).

- Required courses: Stat 535, 536, 624, 641, 642, and 9 hours in statistics courses numbered 600 or above, excluding 698R and 699R.
- Minor (optional): any approved minor.
- Thesis or project.
- Examinations: (A) comprehensive written examination covering Stat 535, 624, 641, and 642, (B) oral defense of project or thesis.
- C+ or better in each class, with an overall cumulative 3.0 GPA in required MS degree classes.

### FINANCIAL ASSISTANCE

The department has limited funds to supplement students' financial resources, and such funds are only available within departmental and university guidelines. All admitted students receive teaching or research assistantships. Some tuition support is available, and is awarded on a competitive basis

### RESOURCES AND OPPORTUNITIES

**Center for Collaborative Research and Statistical Consultation.** The Center operates with full access to all departmental resources to provide statistical expertise to faculty, graduate students, and off-campus researchers in other disciplines. Areas of particular strength are designing experiments and sample surveys and analyzing the resulting data. Problems are solved by application and adaptation of state-of-the-art methodology and development of new methodology as required.

**Computing Facilities.** The Department of Statistics provides several excellent general computer laboratories furnished with computing equipment and software for statistical graphics, data analysis, and statistical computing. These laboratories are reserved for students in the department.



**Department Research.** Faculty members in the Department of Statistics carry out a rich variety of research programs. Research emphases include Bayesian methods, environmental and spatial statistics, reliability of industrial and computing processes, statistical genetics and bio-informatics, mixed models and longitudinal data, data mining, chemometrics, actuarial methods, design and analysis of experiments, and issues in statistical computation. In addition to these general areas, more specific research interests for individual faculty are listed in the faculty section immediately following the course descriptions.

*For a more detailed description of the graduate program requirements, send for a copy of the department's bulletin or visit their website at <http://statistics.byu.edu>.*

## COURSE DESCRIPTION

### STAT

#### **500.(Stat-Chem-C S-Geol-Math-MthEd-Phscs) Business Career Essentials in Science and Math. (1.5)**

Introduction for science, math, and statistics majors to careers in industry. Project planning, oral and written business presentations, business accounting, and technology readiness.

#### **511.Statistical Methods for Research 1. (3)**

Prerequisite(s): STAT 121; or equivalent.

Basic statistical methodologies and experimental design. Topics include simple analysis of variance, multiple regression, analysis of covariance, model selection.

#### **512.Statistical Methods for Research 2. (3)**

Prerequisite(s): STAT 511

Advanced statistical methodologies and experimental design. Topics include multi-way analysis of variance, mixed models analysis of variance, logistic regression, log-linear models, time series models, principal components, canonical correlation, common experimental designs.

#### **535.Linear Models. (3)**

Prerequisite(s): Departmental consent.

Theory of estimation and testing in linear models. Analysis of full-rank model, over-parameterized model, cell-means model, unequal subclass frequencies, and missing and fused cells. Estimability issues, diagnostics.

#### **536.Modern Regression Methods. (3)**

Prerequisite(s): STAT 535 & STAT 624; or departmental consent.

Weighted least squares, Bayesian linear models, robust regression, nonlinear regression, local regression, generalized additive models, tree-structured regression.

#### **538.Survival Analysis. (3)**

Prerequisite(s): STAT 340

Basic concepts of survival analysis; hazard functions; types of censoring; Kaplan-Meier estimates; Logrank tests; proportional hazard models; examples drawn from clinical and epidemiological literature.

#### **590R.Statistical Consulting. (1-3)**

Prerequisite(s): Departmental consent.

Introduction to statistical consulting, oral presentations, presentation packages, written reports. Extensive applied experience in the Center for Collaborative Research and Statistical Consulting.

#### **591R.Graduate Seminar in Statistics. (0)**

#### **595R.Special Topics in Statistics. (1-3)**

Prerequisite(s): Instructor's consent.

#### **595R.Statistical Computations. (1-3)**

Prerequisite(s): Instructor's consent.

#### **595R.Theory of Risk. (1-3)**

Prerequisite(s): Instructor's consent.

#### **599R.Academic Internship: Statistics. (1-9)**

Prerequisite(s): Departmental consent.

On-the-job experience. Report required.

#### **624.Statistical Computation. (3)**

Prerequisite(s): Departmental consent.

Fundamental numerical methods used by statisticians; programming concepts; efficient use of software available for statisticians; simulation studies.

#### **631.Advanced Experimental Design. (3)**

Prerequisite(s): STAT 431 & STAT 535 & STAT 642

Response surface methods, mixture designs, and optimal designs; fractions of two-level, three-level, and mixed-level factorials; analysis of experiments with complex aliasing; robust parameter designs.

#### **635.Mixed Model Methods. (3)**

Prerequisite(s): STAT 535 & STAT 624 & STAT 642

Fixed effects, random effects, repeated measures, nonindependent data, general covariance structures, estimation methods.

#### **637.Generalized Linear Models. (3)**

Prerequisite(s): STAT 535 & STAT 642

Generalized linear models framework, binary data, polytomous data, log-linear models.

## STATISTICS

### **641.Probability Theory and Mathematical Statistics 1. (3)**

Prerequisite(s): Departmental consent.

Axioms of probability; combinatorics; random variables, densities and distributions; expectation; independence; joint distributions; conditional probability; inequalities; derived random variables; generating functions; limit theorems; convergence results.

### **642.Probability Theory and Mathematical Statistics 2. (3)**

Prerequisite(s): STAT 641

Introduction to statistical theory; principles of sufficiency and likelihood; point and interval estimation; maximum likelihood; Bayesian inference; hypothesis testing; Neyman-Pearson lemma; likelihood ratio tests; asymptotic results, including delta method; exponential family.

### **651.Bayesian Methods. (3)**

Prerequisite(s): STAT 536 & STAT 642

Basic Bayesian inference; conjugate and nonconjugate analyses; Markov Chain Monte Carlo methods; hierarchical modeling; convergence diagnostics.

### **666.Multivariate Statistical Methods. (3)**

Prerequisite(s): STAT 535 & STAT 624 & STAT 642

Inference about mean vectors and covariance matrices; multivariate analysis of variance and regression; canonical correlation; discriminant, cluster, principal component, and factor analysis.

### **698R.Master's Project. (1-3)**

Prerequisite(s): Departmental consent.

### **699R.Master's Thesis. (1-6)**

Prerequisite(s): Departmental consent.

## FACULTY

**Berrett, Candace** *Assistant Professor*, PhD, The Ohio State University, 2010. Spatial and Space-time Statistics; Bayesian Modeling, Categorical Data, Applications to the Environmental Sciences

**Blades, Natalie J.** *Assistant Professor*, PhD, Johns Hopkins University, 2003. Infectious Disease Epidemiology; Ordinal Data Models

**Christensen, William F.** *Professor*, PhD, Iowa State University, 1999. Environmental and Spatial Statistics; Multivariate Analysis, Pollution Source Apportionment; Resampling Methods; Climate and Paleoclimate; Applications of Statistics in Politics and Law

**Dahl, David B.** *Associate Professor*, PhD, University of Wisconsin - Madison, 2004. Bayesian nonparametrics: model-based clustering; random partition models; protein structure prediction, bioinformatics; and statistical computing

**Eggett, Dennis L.** *Research Associate Professor*, PhD, North Carolina State University, 1987. Linear Models; Experimental Design; Statistical Computing

**Engler, David A.** *Associate Professor*, PhD, Harvard University, 2007. Model Assessment in High-Dimensional Data Settings; Time Series, Applications in Finance and Environmental Science

**Fellingham, Gilbert W.** *Professor*, PhD, University of Washington, 1990. Bayesian Nonparametrics; Bayesian Hierarchical Models; Applications in Sports, Human Performance, and Health

**Grimshaw, Scott D.** *Professor*, PhD, Texas A&M University, 1989. Analytics; Process Monitoring; Statistical Computing

**Heaton, Matthew J.** *Assistant Professor*, PhD, Duke University, 2011. Spatio-temporal Statistics; Environmental Impacts; Uncertainty Quantification; Statistics in Epidemiology; Bayesian Modeling

**Lawson, John S.** *Professor*, PhD, Polytechnic Institute of New York, 1984. Design and Analysis of Experiments; Reliability Engineering; Statistical Process Control; Record Linkage

**Reese, C. Shane** *Professor*, PhD, Texas A&M University, 1999. Bayesian Hierarchical Models; Bayesian Optimal Experimental Design; Sports Statistics; Reliability; Computer Experiments; Applications of Statistics to National Security Issues; Environmental Statistics

**Schaalje, G. Bruce** *Professor*, PhD, North Carolina State University, 1988. Mixed Linear Models; Experimental Design; Small Sample Inference; Textual Analysis

**Scott, Del T** *Professor*, PhD, Pennsylvania State University, 1977. Statistical Computing; Categorical Data Analysis; Linear Models; Graphical Analysis

**Tass, E. Shannon** *Assistant Professor*, PhD, Rice University, 2009. Biostatistics; Statistical Application in Medicine, Health, and Wildlife; Spatial Statistics and Climate

**Tolley, H. Dennis** *Professor*, PhD, University of North Carolina, 1974. Actuarial methods in Health, Statistical Methods in Analytic Chemistry

## TEACHER EDUCATION

**Chair:** Tunnell, Michael O.

**Graduate Coordinator:** Young, Janet R.

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<http://education.byu.edu/ted/graduate>

### THE PROGRAMS OF STUDY

The Department of Teacher Education offers one graduate program, a Master of Arts (MA) in Teacher Education. The aim of the Master of Arts (MA) program in Teacher Education is to provide a rigorous program focused on inquiry that prepares candidates to improve their practice as teachers, become teacher leaders in schools, districts, and other educational settings, and prepare for doctoral studies or other advanced scholarship.

#### Teacher Education - MA

The master's program is a two-year, evening and summer-intensive program for the working professional. Students move through their course work as a cohort and complete course work on the BYU campus.

The curriculum is both theory and practice based. The teacher education core provides teachers with an understanding of the theories and practices related to their professional assignment and space for considering their role as educators. The research core includes courses in research methods, statistics, qualitative data analysis, and culminates in a thesis. In addition to the teacher education and research cores, students choose one of four specialty areas: literacy education, integrative science-technology-engineering-mathematics (STEM) education, teacher education, or physical education teacher education.

#### Literacy Education

The specialty area in literacy education provides experienced teachers (pre-K-12) with increased knowledge and expertise in key areas related to classroom literacy instruction and prepares them to provide leadership in literacy instruction and professional development programs. The course content is aligned with current standards for reading professionals as set forth by the International Reading Association. Participants who complete the master's degree with a focus in literacy education, meet the coursework qualification for a Level I Utah Education Reading Endorsement as well as receiving their MA.

#### Integrative STEM Education

The Integrative Science-Technology-Engineering-Mathematics (STEM) specialty provides experienced teachers (pre-K-12) the opportunity to strengthen their ability to (a) offer quality integrated STEM experiences for students in their own classrooms, and (b) encourage students to enter STEM-related fields. Candidates will also be prepared as teacher leaders in STEM education within their schools and districts, thereby preparing them to act as mentors for beginning teachers and enabling them to support the ongoing education of other teachers.

#### Teacher Education

The specialty area in teacher education provides experienced teachers (pre-K-12) with opportunities to develop and deepen their theoretical, philosophical, historical, and practical understandings of teaching, the process of becoming a teacher, and the process of continuing professional development. Particular emphasis is placed on developing the knowledge and ability needed to improve one's own teaching practice and to assist others in becoming better teachers.

#### Physical Education Teacher Education

Experienced pre-K-12 teachers completing the program with the PETE specialty area will strengthen their ability to (a) offer quality physical education and lifetime wellness experiences for students, (b) complete further graduate work and become teacher educators in higher education, and (c) return to the public school setting as on-site teacher educators or district specialists in Physical Education curriculum, health and wellness, thereby preparing them to act as mentors for beginning teachers and enabling them to support the ongoing education of other teachers.

#### Requirements for Degree.

- Credit hours (39-42v): 33-36 hours plus 6 hours of thesis (T Ed 699R).
- Required core courses: T Ed 602 and 604.
- Required research courses: T Ed 691, 692, 693.
- Specialty area courses: literacy education (T Ed 603, 620, 621, 622, 623, 624, 625), integrative STEM education (T Ed 680, 681, 682, 683, 684, 685), teacher education (T Ed 603, 660, 661, 662, 663R, 664, 665), or PETE (T Ed 640, 641, 642, 643, 644, 645).
- Thesis (T Ed 699R).
- Examinations: oral defense of course work and oral defense of thesis (consult department for details).

### FINANCIAL ASSISTANCE

Financial assistance for tuition, books, travel or other expenses is granted to graduate students in the Department of Teacher Education as university funding permits. A limited number of research assistantships may also be funded through faculty research grants.

## TEACHER EDUCATION

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For outside funding sources please click on the link: <http://certificationmap.com/how-to-become-a-teacher/scholarships-for-teachers/>

### RESOURCES AND OPPORTUNITIES

**Computer laboratories** on campus provide students with internet access and assistance with electronic thesis submission. Mac and Windows computers in the laboratories also provide graduate students with a variety of computer software packages. All computers have access to myBYU and Learning Suite which provide services such as e-mail and class discussion groups.

**Graduate student office space** is available for graduate students who are working with faculty on research, evaluation, and development projects.

### COURSE DESCRIPTION

#### EL ED

**693R. Directed Individual Study.** (0.5-4)

#### T ED

**602. Contemporary Theories of Learning and Teaching.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Contemporary theories of learning and teaching from personal and public perspectives and how those theories converge with professional practice in classrooms and schools.

**603. Content-Area Literacy Instruction.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Content-area instructional strategies attuned to vocabulary, concept development demands, nature of content-area texts. Issues of negotiating and creating texts in content-area disciplines.

**604. Education for Democracy.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

The public purposes of education, including preparing students for active participation in a democracy.

**620. Foundations of Literacy.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Historical and theoretical perspective of literacy-related issues and challenges. Implications for making well-informed decisions that benefit all students.

**621. Literature for Young People.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Overview of fiction and nonfiction literature for elementary and secondary school students (K-12); authors, current trends, and cross-curriculum classroom applications.

**622. Literacy Development and Instruction.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Emergent, early, and adolescent literacy development; ideas for constructing appropriate literacy learning environments, experiences, and instructional interventions for students pre-K-12.

**623. Reading Comprehension Instruction.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Current theories and models of reading comprehension. Implications for comprehension instruction considering cultural, linguistic, and cognitive differences; curriculum; curriculum integration; motivational strategies.

**624. Writing Instruction.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Writing development, including spelling, handwriting, and vocabulary. Instructional practices for teaching the writing process, integrating reading, listening, speaking, and assessment.

**625. Literacy Assessments and Interventions.** (3)

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Formal and informal assessment procedures. Appropriate instructional interventions for students of varying ages, performance levels, and linguistic abilities, particularly struggling students.

**640. Foundations in Physical Education Teacher Education Research.** (3)

Prerequisite(s): Acceptance into the T Ed MA program.

Theory and application of roles of teacher education in research, teaching, and clinical evaluation.

**641. Issues and Trends in Physical Education Teacher Education.** (3)

Prerequisite(s): Acceptance into the T Ed MA program.

PETE landmark research, current trends and future direction.

**642. Curriculum and Instructional Theory and Design in Physical Education.** (3)

Prerequisite(s): Acceptance into the T Ed MA program.

Theories, concepts, and practices associated with design and delivery of physical education in the public schools and in physical education teacher education.



**643. Physical Education for Special Populations. (3)**

Prerequisite(s): Acceptance into the T Ed MA program.

Theoretical and practical aspects of teaching individuals with disabilities in the physical education setting.

**644. Advocacy in Physical Education Teacher Education. (3)**

Prerequisite(s): Acceptance into the T Ed MA program.

History, concepts, issues, current trends, and professional practices associated with becoming an effective advocate for physical education at local, regional, and national levels.

**645. Seminar in Physical Education Teacher Education. (3)**

Prerequisite(s): Acceptance into the T Ed MA program.

Exploration, synthesis, and discussion of current PETE research, methodologies, and merits of various studies from a teacher educator perspective.

**660. History of Teaching and Teacher Education. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

History of teaching as a cross-generational social and cultural activity; teacher education as a professional practice with present-day educational implications.

**661. Classroom as Culture and Knowledge System. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Classrooms as culture and knowledge systems and how those systems are created and sustained over time.

**662. Teacher Learning and Development. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Various models and aspects of teacher development. Topics include teacher identity formation, socialization, expertise, life and career cycles, burnout, and renewal.

**663R. Seminar in Teacher Education. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

**664. Mentoring and Supervision. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Current research and trends in mentoring, including issues of supervising teachers. Implications for supporting development of beginning and experienced teachers.

**665. Best Practices in Teacher Education. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Teacher education curriculum; theories and research that support current practice; improving that practice.

**680. Historical Foundations of STEM Education. (3)**

Prerequisite(s): Acceptance into MA in teacher education program or instructor's consent.

Historical and philosophical foundations of the STEM education disciplines, including socio-cultural, economic, and political influences.

**681. The Nature of STEM Discourse and Participation. (3)**

Prerequisite(s): Acceptance into MA in teacher education program or instructor's consent.

The nature of various STEM disciplines; how individuals learn, know, communicate, and participate within and between STEM disciplines given contemporary theories of learning and teaching.

**682. Advanced STEM Education Pedagogy. (3)**

Prerequisite(s): Acceptance into MA in teacher education program or instructor's consent.

Inquiry-based pedagogies characteristic of STEM education applying contemporary theories of teaching and learning. Integrating STEM disciplines through a variety of instructional strategies and models.

**683. Advanced STEM Education Curriculum and Development. (3)**

Prerequisite(s): Acceptance into MA in teacher education program or instructor's consent.

Strategies for teaching a variety of topics. Developing and implementing integrated STEM curricula.

**684. Issues and Trends in STEM Education. (3)**

Prerequisite(s): Acceptance into MA in teacher education program or instructor's consent.

Current STEM education trends and issues related to emerging policies and legislation, current practice, teacher preparation, and initiatives at all levels. Weekly seminars on current research within the evolving STEM disciplines.

## TEACHER EDUCATION

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### **685.Research and Assessment in STEM Education. (3)**

Prerequisite(s): Acceptance into MA in teacher education program or instructor's consent.

Contemporary modes of assessment and evaluation in STEM education and research. Complementing and extending traditional modes of assessment and evaluating quality, analyzing trends, and drawing conclusions regarding the effects of STEM education on student learning.

### **691.Introduction to Research Design. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Designing, conducting, analyzing, reporting, and evaluating research studies in education.

### **692.Data Analysis. (3)**

Prerequisite(s): T ED 691

Teacher education and school-based research data analysis. Quantitative: sampling, hypothesis testing, descriptive statistics, correlations, simple linear regression, variance. Qualitative: memoing, coding, category systems, enumeration.

### **693.Qualitative Data Analysis. (3)**

Prerequisite(s): Membership in teacher education cohort or instructor's consent.

Introduction to methods of qualitative inquiry for teachers studying their own and others' practice or other issues in education.

### **698R.Action Research Project. (1-6)**

Developing, observing, gathering, interpreting, and reporting data from action research project. Two project credit hours must be taken during semester of project defense.

### **699R.Master's Thesis. (0.5-2)**

Formal report/defense of substantive research, evaluation, or curriculum project that makes original contribution to field.

Thesis credit hours distributed and accompanied by seminars.

## FACULTY

**Bahr, Damon L.** *Associate Professor, EdD, Brigham Young University, 1988. Mathematics Education, Curriculum and Instruction, Assessment*

**Barney, David** *Associate Professor, EdD, Florida State University, 2002. Physical Education Teacher Education*

**Bullough Jr., Robert V.** *Professor, PhD, Ohio State University, 1976. Teacher Education*

**Cutri, Ramona M.** *Assistant Professor, PhD, University of California, Los Angeles, 1997. Multicultural Education*

**Draper, Roni Jo** *Professor, PhD, University of Nevada, Reno, 2000. Literary Education, Teacher Education, Research Design*

**Erickson, Lynnette B.** *Associate Professor, PhD, Arizona State University, 1996. Social Studies Education, Teacher Education*

**Feinauer, Erika** *Assistant Professor, EdD, Harvard University, 2006. Literacy Education*

**Hall-Kenyon, Kendra** *Associate Professor, PhD, Columbia University, 2002. Early Childhood Education, Literacy Education, Teacher Education*

**Jensen, Bryant** *Assistant Professor, PhD, Arizona State University, 2009. Multicultural Education*

**Korth, Byran** *Assistant Professor, PhD, Auburn University, 2000. Early Childhood Education*

**Monroe, Eula E.** *Professor, EdD, George Peabody College for Teachers of Vanderbilt University, 1980. Mathematics Education, Curriculum and Instruction*

**Morrison, Timothy G.** *Associate Professor, PhD, University of Illinois, 1986. Literacy Education, Teacher Education*

**Newberry, Melissa** *Assistant Professor, PhD, The Ohio State University, 2008. Adolescent Development*

**Pennington, Todd R.** *Associate Professor, PhD, Virginia Tech, 1998. Curriculum and Instruction - Sport Pedagogy*

**Pinnegar, Stefinee E.** *Associate Professor, PhD, University of Arizona, 1989. Teacher Education, TESOL*

**Prusak, Keven A.** *Associate Professor, PhD, Arizona State University, 2000. Physical Education Teacher Education*

**Richardson, Michael J.** *Assistant Professor, PhD, Brigham Young University, 2009. Adolescent Development*

**Rosborough, Alex** *Assistant Professor, PhD, University of Nevada, Las Vegas, 2010. Multicultural Education, TESOL*

**Smith, Leigh** *Associate Professor, PhD, University of Utah, 2002. Science Education, Teacher Education*

**Tunnell, Michael O.** *Professor, EdD, Brigham Young University, 1986. Children's Literature*

**Whiting, Erin Feinauer** *Assistant Professor, PhD, University of Missouri-Columbia, 2006. Multicultural Education, Inequality, Home, Family and Community Connections to Schools, Community Studies*

**Wilcox, Bradley Ray** *Associate Professor*, PhD, University of Wyoming, 1994. Curriculum and Instruction, Literacy Education, Children's Literature, Education in International Settings

**Wilkinson, Carol** *Associate Professor*, EdD, Brigham Young University, 1983. Physical Education Teacher Education

**Wimmer, Jennifer** *Assistant Professor*, PhD, University of Nevada, Las Vegas, 2010. Content Area Literacy, Literacy Education, Teacher Education

**Young, Janet R.** *Associate Professor*, PhD, University of Oklahoma, 1996. Literacy Education, Teacher Education

**Young, Terrell A.** *Professor*, EdD, Brigham Young University, 1988. Children's Literature, Literacy Education, Teacher Education

## TECHNOLOGY

**Chair:** Lunt, Barry M.  
**Graduate Coordinator:** Harrell, Charles R.

265 CTB, Provo, UT 84602-4206  
(801) 422-6300  
<http://www.et.byu.edu/sot>

## THE PROGRAMS OF STUDY

The Master of Science in technology degree is designed to develop leaders to respond to the needs of a technology-based society for advanced technical, managerial, and educational personnel. Graduate level leadership and technology application capabilities are developed through rigorous courses and in-depth research and development experiences. The MS in technology provides opportunities for students to engage in applied technical research that adds to the knowledge of relevant practice or solves problems that arise in the workplace.

One degree is offered through the School of Technology: Technology-MS.

### Technology - MS

The School of Technology, an academic unit in the College of Engineering and Technology, provides a Master of Science degree with specialization in Construction Management, Information Technology, Manufacturing Systems, or Technology and Engineering Education.

Twenty-six faculty professionals having diverse educational and experiential backgrounds provide strong research expertise and student mentoring. The faculty members are well-published, belong to professional societies, and are involved in developing and commercializing recognized software and hardware products used throughout the world.

### Requirements for Degree.

The technology MS degree must be completed within three years.

- Credit hours: 24 minimum approved course hours plus 6 thesis hours (Tech 699R).
- Required courses: Tech 638, 699R.
- Specialization: minimum 21 hours from approved courses in the area of study. An approved study list is required.
- Examination: Oral defense of thesis.

### Construction Management

*Advisor:* Clifton Farnsworth

The master's degree offered by Brigham Young University's School of Technology, with an emphasis in construction management, is designed for students who are interested in deepening and broadening their knowledge of construction management beyond their undergraduate CM degree through a rigorous graduate program that includes research at the forefront of the discipline. The MS degree provides excellent preparation for professional practice and a solid foundation for those interested in continuing their graduate studies. Applicants are encouraged to become familiar with the research interests of graduate faculty members in construction management.

Students enrolling in the CM master's program immediately following their undergraduate studies are strongly encouraged to fulfill a professional work experience (or internship) within the industry prior to entering the graduate program. Students are also encouraged to fulfill an internship as part of their graduate experience.

- Required courses: CM 555, CM 600, CM 630, CM 640, CM 650.
- Approved electives: 6 credit hours.

## TECHNOLOGY

### Information Technology

*Advisor:* Derek Hansen

Those qualifying for this specialization prepare for information technology (IT) leadership positions in an organization of their choice. The curriculum addresses the many applications and developments of IT, focusing on those in science, engineering, and technology. The MS degree is awarded to students who have mastered a professional level of education in core and related areas of information technologies.

- A minimum of 21 graduate hours approved by your committee, including at least 12 hours from the IT emphasis courses (IT 500 or IT 600 level).

### Manufacturing Systems

*Advisor:* Charles Harrell

Students who have graduated in manufacturing engineering technology or related technical areas will find that this specialization is an opportunity to prepare for a career in a rapidly growing field. Increased international focus on productivity, quality, and automation has thrust the most advanced concepts of technology and management directly into the manufacturing arena. The critical need for integrating and applying these concepts into manufacturing systems is central to this specialization.

- A minimum of 21 graduate hours approved by your committee, including at least 18 hours from the MS emphasis courses (Mfg 500 or Mfg 600 level courses).

### Technology and Engineering Education

*Advisor:* Geoffrey Wright

The technology and engineering education specialization helps students who have graduated in technology and/or engineering teacher education or related areas to be more effective leaders. The opportunity will be theirs to achieve knowledge and skills for leadership in teaching, supervising, and

managing in schools or industry. Through a research-oriented thesis, students will develop writing and research abilities related to technology and engineering education.

- Required courses: Stat 511, TEE 610, 625, 675.
- Approved electives: 11 hours, based upon committee approval.

### FINANCIAL ASSISTANCE

The School of Technology offers a limited number of scholarships. Application for financial aid is made through the program's graduate coordinator.

### RESOURCES AND OPPORTUNITIES

Nationally recognized instructional laboratories are available to provide students with the most current concepts, curriculum, software, equipment, and laboratory instructional/ physical organization.

### COURSE DESCRIPTION

#### CFM

##### 555.Construction Company Financial Management. (3)

Prerequisite(s): CFM 425 & CFM 445

An in-depth review of management concepts and financial strategies needed to successfully grow and enhance profitability of a construction company. Topics include business entities, budgeting and cash management, finance and investments, accounting, financial statements, cost controls (variance and earned value analysis), real estate investing, taxation, break even analysis and capital budgeting.

##### 600.Trends and Issues in Managing Construction. (3)

Current political, regulatory, technological, environmental, and leadership trends and issues.

##### 630.Managing Human Resources in Construction Companies. (3)

Managing human resources in construction companies including hiring, firing, retention, training and employee development motivation, incentives, personality profiles and company culture.

##### 640.Managing Risk in Construction. (3)

Prerequisite(s): CFM 385

Managing the factors that create risk in a construction company, including contract administration, ethical practices, safety, international risks, insurances, and bonding.

##### 650.Construction Company Development and Strategic Planning. (3)

Prerequisite(s): CFM 445

Advanced topics in the development of construction companies, including strategic planning, negotiations, banking relations, successful companies, risk management, productivity, trending and forecasting, zoning and development, entitlements, career balance, and sub-contract and resource management.

##### 695R.Special Topics in Construction Management. (3)

Based on needs, interest, and significance, topics important to leaders and managers in the construction industry.

#### IT

##### 515R.Special Topics in Information Technology. (1-3)

New topics in information technology for graduate and undergraduate students. Standard lecture and lab format.

##### 529.Advanced Networking. (3)

Prerequisite(s): IT 344, 347; or equivalents.

Analyzing, selecting, configuring, monitoring, and managing of computer network equipment. SNMP-based monitoring and control in process of fault isolation and root cause analysis.



**548.Mechatronics. (3)**

Prerequisite(s): Instructor's consent.

Synergistic application of mechanical devices, electronic controls, and cyber-system principles. Design of integrated systems that interact between the real world and the IT cyber-space environment. Advanced applications of automation and control.

**555.Advanced Human-Computer Interaction. (3)**

Prerequisite(s): IT 355; or instructor's consent.

Advanced techniques for designing, prototyping, building, and evaluating technology-mediated user experiences. Human-computer interaction research methods including experimental design. Ethics of working with human subjects. HCI theories and best practices.

**566.Digital Forensics. (3)**

Prerequisite(s): IT 466 or equivalent.

Fundamentals of digital forensics, legal issues, evidence, chain of custody, media analysis, incident response, corporate forensics, and network forensics.

**567.Cyber Security and Penetration Testing. (3)**

Prerequisite(s): IT 466 or C S 465 or IS 560; or equivalent content course from another institution; or concurrent enrollment.

Advanced computer systems security. Vulnerabilities and exploits. System and network attacks. Ethical hacking and penetration testing. Cyber security, cyber weapons, and advanced persistent threats. Legal and regulatory requirements for security and privacy.

**670.Web and Social Media Analytics. (3)**

Prerequisite(s): IT 350 & IT 355; or instructor's consent.

Techniques for managing, exploring, visualizing, and analyzing web and social media data including social network analysis, search engine optimization, ethical treatment of social data, and web analytics research methods.

**695R.Information Technology Special Topics. (0.5-4)**

Prerequisite(s): Departmental and instructor's consent.

Unique topics in information technology for graduate students only. Independent study with a faculty mentor.

**MFG****531.Advanced Computer-Aided Manufacturing Programming. (3)**

Prerequisite(s): MFG 230 or previous CNC programming experience, or instructor's approval.

CAD/CAM programming techniques and requirements for manufacturing components on computer numerical-control machine tools, emphasizing CAM programming, postprocessors, and CAM software evaluation.

**532.Manufacturing Systems. (3)**

Prerequisite(s): Mfg 480 or instructor's consent.

Analyzing lean manufacturing systems. Numerous examples and case studies from industry demonstrating principles of lean production, inventory management, and lean distribution. Project with a local company to gain confidence with these principles in an industrial setting.

**533.Manufacturing Information Systems. (3)**

Prerequisite(s): Mfg 480 or instructor's consent.

Applying and integrating software and information technologies in planning, executing, and monitoring production operations.

**555.Composite Materials and Processes. (3)**

Prerequisite(s): Graduate standing or instructor's consent.

Structure, processing, properties, and uses of composite materials, including various manufacturing methods and the relationship between properties and fabrication.

**574.Advanced Tool Design. (3)**

Prerequisite(s): MFG 431

Advanced design of net-shape products utilizing CAD and CAE methods. Plastic injection mold design and construction. Rapid prototyping and injection molding project.

**575.Packaging Technologies. (3)**

Prerequisite(s): IT 318 & MFG 431

Fundamentals of packaging technologies; materials, design and processes. Understanding of the importance and role of packaging in the manufacturing and product environment. Combined instruction and hands-on project application of the various aspects of packaging materials, design, and processes through individual and team assignments, written reports, and oral presentations.

**580.Manufacturing Simulation. (3)**

Prerequisite(s): MFG 480

Design and optimization of manufacturing systems using simulation. Simulation languages and modeling methodology.

**695R.Manufacturing Engineering Technology Special Topics. (0.5-4)**

Prerequisite(s): Departmental and instructor's consent.

Topics arranged in consultation with instructor.

**TECH****601.Research and Development in Technology. (3)**

Success strategies in graduate programs. Identifying appropriate direction of research and study. Research tools as aids in decision making: strategies, literature, logic, survey techniques, research design, statistics, computers. Preparing proposals for research papers and thesis research; organizing first three thesis chapters.

## TECHNOLOGY

### **638.Technology Leadership. (3)**

Strategic planning and policy development. Theoretical and practical leadership aspects of conceptual and implementation processes. Articulation and team building among various organizations. Ethics and conflict resolution. Developing and implementing solutions to special problems; advanced skills/concepts in traditional and emerging technology areas.

### **695R.Technology Special Topics. (0.5-9)**

Prerequisite(s): Instructor's and departmental consent.

Topics arranged in consultation with instructor.

### **699R.Master's Thesis. (0.5-9)**

Prerequisite(s): Departmental consent.

## **TEE**

### **593R.Workshop in Applied Technology Education. (0.5-2)**

Teaching and learning technological literacy skills. Reviewing and participating in current technological advances, with a focus on teaching practice and methods.

### **610.History and Philosophy of Technology Education. (2)**

Historical and philosophical basis of today's technology programs.

### **625.Teaching and Learning in Technology Education. (2)**

Identifying, developing, and implementing instructional strategies unique to technology education.

### **635.Facility Design for Applied Technology Programs. (2)**

Developing instructional facilities and educational specifications for vocational and technology laboratories.

### **675.Curriculum Development in Technology Education. (3)**

Prerequisite(s): Graduate standing.

### **695R.Technology and Engineering Education Special Topics. (0.5-3)**

Prerequisite(s): Departmental and instructor's consent.

Topics arranged in consultation with instructor.

## **FACULTY**

**Burr, Kevin L.** *Associate Professor*, EdD, Oklahoma State University, 1997. Construction Management; Teacher Education

**Campbell, Jeffery L.** *Associate Professor*, PhD, University of Idaho, 1999. Facilities Management; Strategic Planning; Construction Marketing

**Christensen, Kip W.** *Professor*, PhD, Colorado State University, 1991. Teacher Education

**Christofferson, Jay P.** *Professor*, PhD, Colorado State University, 1996. Computerized Systems in Construction Management

**Ekstrom, Joseph J.** *Associate Professor*, PhD, Brigham Young University, 1991. Network Management, Switching, Routing; Software/Hardware Systems Development and Modeling

**Farnsworth, Clifton** *Assistant Professor*, PhD, University of Utah, 2008.

**Fry, Richard E.** *Associate Professor*, MFA, University of Illinois, 1994. Product Industrial Design

**George, Andrew R.** *Assistant Professor*, PhD, University of Stuttgart, 2011. Plastics and Composites Materials; Modeling, Simulation, and Optimization

**Hansen, Derek** *Assistant Professor*, PhD, University of Michigan, 2007. Social Media; Social Network Analysis; Human-Computer Interaction

**Harrell, Charles R.** *Associate Professor*, PhD, University of Denmark, 1988. Simulation; Lean Manufacturing

**Hawks, Val D.** *Associate Professor*, PhD, Gonzaga University, 2005. Leadership; Global Issues; Quality; Ethics

**Helps, C. Richard G.** *Associate Professor*, MSc Eng, Witwatersrand University Johannesburg, . .

**Howell, Bryan** *Associate Professor*, MFA, University of Texas, Austin, 2003. Industrial Design

**Hutchings, Mark D.** *Associate Professor*, PhD, Texas A&M University, 2002. Construction Company Management; Legal Aspects of Construction; Real Estate, Investment, and Development

**Lunt, Barry M.** *Professor*, PhD, Utah State University, 1993. Long-Term Digital Data Storage

**Miles, Michael P.** *Professor*, PhD, Ecole des Mines de Paris, 1995. Lean Manufacturing; Materials Science; Finite Element Analysis

**Miller, Kevin R.** *Associate Professor*, PhD, Arizona State University, 2001. Construction Estimating with Electronic Documents

**Rowe, Dale C.** *Assistant Professor*, PhD, University of Kent, 2010. Identity, Biometrics, and Security

**Shumway, Steven L.** *Associate Professor*, PhD, Utah State University, 1999. Student Learning and Motivation Theory

**Skaggs, Paul T.** *Associate Professor*, MFA, Rochester Institute of Technology, 2002. Interior Design

**Teng, Chia Chi** *Associate Professor*, PhD, University of Washington, 2007. Computer Vision; Biomedical Informatics; Biomedical Image Processing

**Terry, Ronald E.** *Professor*, PhD, Brigham Young University, 1976. Student Learning and Pedagogy of Engineering and Technology

**Tew, Kevin** *Assistant Professor*, PhD, University of Utah, 2013. Computer Networks and Databases

**Weidman, Justin E.** *Assistant Professor*, PhD, Virginia Tech, 2012. Construction Means & Methods and Safety Education

**Wright, Geoffrey A.** *Assistant Professor*, PhD, Brigham Young University, 2008. Technology Engineering Education

## THEATRE AND MEDIA ARTS

**Chair:** Jensen, Amy  
**Graduate Coordinator:** Jones, Megan Sanborn

D-581 HFAC, Graduate Secretary: Rene Helfert  
(801) 422-6645  
[rene.helfert@byu.edu](mailto:rene.helfert@byu.edu)  
<http://cfac.byu.edu>

### THE PROGRAMS OF STUDY

This program is a scholarly two-year degree. Students should be in residence for the duration of the program. The coursework consists of a core of history/theory classes supplemented by electives chosen by the student in conjunction with her/his advisor. The program wraps up with comprehensive exams and the writing of a solid scholarly thesis. There are two possible emphases: Theatre History and Critical Studies, or Media Arts Education.

The Theatre History and Critical Studies emphasis is meant to springboard students into either teaching at the community college level or further graduate studies at a PhD level. It includes intensive reading of dramatic literature and contemporary scholarship, critical study of both linguistic and social theories, writing for presentation and publication, and opportunities for dramaturgy training. The best writing samples for the application are papers dealing with critical analysis of theatre. They could be advanced undergraduate papers or published articles.

While we encourage our Master's students to support their academic endeavors with practical theatre (or more limited media arts) experience, *the program is centered on scholarship, not on production.*

The Media Arts Education emphasis is primarily designed for students who are already full-time secondary education teachers or individuals who would like to pursue a PhD in media education. Students who are

interested in educational outreach and media literacy advocacy in various public settings should apply. Most classes are offered in the evening and during the spring and summer. Writing samples for the application should be advanced undergraduate research or analytical essays.

### Theatre and Media Arts - MA

Areas of emphasis: Theatre Arts History, Theory, Criticism; Media Education.

#### Requirements for Degree.

- Credit hours (32): minimum 26 course work hours plus 6 thesis hours (TMA 699R) (minimum 20 hours must be in theatre/media arts or theatre/media arts-related courses).
- Required courses: all MA students will complete TMA 690; students in theatre arts history, theory, or criticism will also complete TMA 600, 601, 602, 696R and 3 hours of media arts history, theory, or criticism; students in media education will also complete TMA 668, 680, 687, 689, 691, 700; all MA students will complete their coursework with electives, selected in consultation with the advisory committee.
- Minor (optional): any approved minor.
- Thesis: thesis must make a genuine contribution to body of knowledge and meet highest academic standards. Three kinds of thesis research will be accepted: (A) scholarly analysis of theatre or media education history, theory, or criticism; (B) research and strong creative achievement in theatre arts or media education; (C) qualitative research including action research.
- Examinations: (A) comprehensive written examination; (B) comprehensive oral examination; (C) oral defense of thesis.

## FINANCIAL ASSISTANCE

The following financial support is available through the Department of Theatre and Media Arts:

**Assistantships.** Graduate students may work in many areas, including performance, production, research, and teaching. Applicants must have appropriate background and experience to be considered. Assistantships range up to half-time; pay is based on applicant's experience, year in school, and the type of assistantship.

**Supplemental Tuition Awards.** Supplemental tuition awards are offered by the department during all semesters and terms. The size of these awards is determined by the applicants' qualifications and the availability of funds.

## COURSE DESCRIPTION

### TMA

**515R.Special Projects 3.** (1-6)  
Prerequisite(s): Theatre and media arts students: by application.

Advanced special projects in theatre or media arts.

**515R.Special Projects 3: Media.** (1-6)  
Prerequisite(s): Theatre and media arts students: by application.

Advanced special projects in media arts.

**536R.Directing Workshop.** (0.5-3)  
Prerequisite(s): TMA 436; application required.

Advanced experience in directing.

**551R.Playwriting 4.** (3)  
Prerequisite(s): TMA 451 or instructor's consent.

Workshop course designed to assist more advanced students in furthering their playwriting skills by writing or rewriting a play.

**561R.Stage Management Project.** (1-6)

Prerequisite(s): TMA 461R. Theatre arts studies major or minor status. Instructor's consent.

Hands-on training for student stage managers through assigned realized productions, including supervision through full positions on stage and media productions. Department-arranged assignments.

**599R.Academic Internship.** (1-9)  
Prerequisite(s): Theatre students: TMA 115; by application only. Media students: TMA 112 and 114 and 185/105; by application only. TMA graduate student: by application only.

Off-campus experience or internship in theatre or media arts.

**599R.Academic Internship: Media.** (1-9)  
Prerequisite(s): TMA 112 & TMA 114 & TMA 185; by application only.

Off-campus experience or internship in media arts.

**600.Theatre History and Theory 1: Greek through Renaissance.** (3)

Theatre history sites--Greek through Renaissance--emphasizing existing archives, representative texts and cultural documents, and contemporary criticism.

**601.Theatre History and Theory 2: Elizabethan through Eighteenth Century.** (3)

Theatre history sites--Elizabethan through eighteenth century--emphasizing existing archives, representative texts and cultural documents, and contemporary criticism.

**602.Theatre History and Theory 3: 19th - 21st Centuries.** (3)

Prerequisite(s): TMA graduate student status or instructor's consent.

Theatre history sites--nineteenth through twenty-first centuries--emphasizing existing archives, representative texts and cultural documents, and contemporary criticism

**610.Dramaturgy 1.** (3)

Prerequisite(s): TMA graduate student status or instructor's consent.

Graduate-level research and application of hands-on theatrical skills in four critical studies areas: literary management, production dramaturgy, new play development, educational outreach.

**611.Dramaturgy 2.** (3)

Prerequisite(s): TMA 610

Develop further research and hands-on theatrical skills in four critical studies areas: literary management, production dramaturgy, new play development, educational outreach.

**612R.Production Dramaturgy.** (1-3)

Prerequisite(s): TMA 610 & TMA 611; and instructor's consent.

Experience as lead dramaturg for main-stage productions; building casebooks and overseeing audience education efforts. Rehearsal and production meeting attendance required.

**616.Theatre and Media Arts Instruction.** (1)

Prerequisite(s): TMA graduate student status or instructor's consent.

Developing teaching methods and techniques for instruction in theatre and media arts classroom.

**668R.Special Studies in Theatre or Media Arts.** (1-3)

Prerequisite(s): Instructor's consent.

Supervised research in selected historical, theoretical, or critical problems.

**671R.Advanced Directing.** (3)

Prerequisite(s): Instructor's consent.

Theories and techniques of directing for the stage through directing projects for public presentation.



**674R.Projects in Theatre or Media Arts. (1-4)**

Prerequisite(s): TMA graduate major status. Instructor's consent.

Supervised applied theory in playwriting/screenwriting, directing, acting, design, criticism, stagecraft, or curriculum design.

**680.Media Production Experience for Secondary Teachers. (3)**

Prerequisite(s): TMA graduate major status.

Basics of film and video production as they apply to the secondary classroom/student.

**687.Pedagogical Theory and Methods of Media Instruction. (3)**

Prerequisite(s): TMA graduate major status.

Educational methods and techniques for addressing media in the secondary classroom; educational models and theories related to cultural and historical representations of media technologies.

**689.Film History. (3)**

Prerequisite(s): TMA graduate major status.

Social, aesthetic, financial, and technical dimensions of film and media. Key methodologies for teaching film history.

**690.Introduction to Graduate Studies in Theatre and Media Arts. (3)**

Prerequisite(s): TMA graduate major status.

Introductory seminar required of all graduate students during first semester or term that class is offered.

**690.Introduction to Graduate Studies: Theatre. (3)**

Prerequisite(s): TMA graduate major status.

Introductory seminar required of all graduate students during first semester or term that class is offered.

**691.Screens Theory. (3)**

Prerequisite(s): TMA graduate major status.

Identifying and analyzing similarities and discontinuities in moving images, from classical film through digital media.

**699R.Master's Thesis. (1-9)**

Prerequisite(s): TMA graduate major status. Instructor's consent.

**700R.Master Seminar. (3)**

Prerequisite(s): TMA graduate major status. Instructor's consent.

Selected topics.

**FACULTY**

**Barber, Brad** *Assistant Professor*, MFA, University of Southern California, 2005. Media Arts Production

**Duncan, Dean** *Associate Professor*, PhD, University of Glasgow, Scotland, 1999. Film History; Theory; Criticism

**Farahnakian, Mary H.** *Professor*, PhD, Brigham Young University, 1977. Costume Design; Costume History

**Heiner, Barta** *Professor*, MFA, American Conservatory Theatre, 1977. Acting; Directing

**Hollingshaus, Wade** *Assistant Professor*, PhD, University of Minnesota, 2008. Theatre History/ Theory/Criticism; Dramaturgy; Performance Studies

**Jensen, Amy Petersen** *Associate Professor*, PhD, University of Illinois at Urbana Champaign, 2003. Media Education; Secondary Education

**Jones, Megan Sanborn** *Associate Professor*, PhD, University of Minnesota, 2003. Theatre History/ Theory/Criticism

**Kraczek, Michael** *Assistant Professor*, MFA, Yale University, 2010. Technical Design and Production

**Larsen, Darl** *Professor*, PhD, Northern Illinois University, 2000. Film History; Genres; Asian Cinemas; History of Animation; Screenwriting

**Livingston, Lindsay** *Assistant Professor*, PhD, CUNY Graduate Center, 2013. Theatre History/ Theory/Criticism; Performance Studies

**Morgan, David E.** *Associate Professor*, MFA, National Theatre Conservatory, 1990. Acting; Directing

**Nelson, George D.** *Professor*, MFA, University of Washington, 1979. Child Drama; Secondary Education

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**Scanlon, Rory R.** *Professor*, MFA, University of Illinois, 1984. Set and Costume Design; Costume History; Lighting Design

**Sorensen, Rodger D.** *Professor*, PhD, University of Texas at Dallas, 1999. Directing

**Swenson, Sharon** *Assistant Professor*, PhD, University of Utah, 1993. Film History; Theory; Criticism

**Thevenin, Benjamin** *Assistant Professor*, PhD, University of Colorado, 2012. Media Arts Critical Studies

**Threlfall, Timothy A.** *Professor*, MFA, University of Washington, 1987. Acting; Music Dance Theatre; Directing



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